



THE SOLUTION PARTNER  
FOR HIGH-TECH INDUSTRY

**EXTRAMET**  
WE LIVE FOR CHALLENGES 

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# WELCOME AT EXTRAMET

**Precise, durable and sustainable solutions in tungsten carbide – that is what EXTRAMET is all about!**  
**In 1980 EXTRAMET opened its doors in Plaffeien, Switzerland. The company has evolved from a three-man operation into an international force for innovation and development of tungsten carbide materials with over 180 employees.**

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Ever since EXTRAMET was founded, our company has continued to focus on its core competence – the manufacture of extruded tungsten carbide. Our emphasis is on innovation and precision with a focus on the high-tech industries. Our product range has developed continuously, as has the entire company. Whereas previously we mainly manufactured solid tungsten carbide rods for the tool industry, these days we offer our customers and partners customized solutions for their needs, in addition to a comprehensive product range.

As a high-tec solution partner, EXTRAMET supports customers by optimizing production processes thereby reducing overall costs. Our high level of precision along with high purity tungsten carbide make EXTRAMET an ideal partner for companies who demand the highest standards for their products.

Quality and reliability are a main component of our philosophy. Our highly trained and experienced staff strive to find the best solution using unique tungsten carbide compositions for all of our customers.





A man with dark, curly hair and a beard is standing in a modern, brightly lit garage. He is wearing a grey t-shirt under grey overalls with black straps. He is holding a large, clear, curved object, likely a car head blank, which is partially obscuring his face. The background shows a blue car parked in the garage. The overall tone is professional and industrial.

«Our replaceable head blanks  
cut tool costs by a third.»

# ECONOMICAL AND FLEXIBLE IDEAS FOR THE AUTOMOTIVE INDUSTRY

**Rising commodity prices, higher demands on process reliability and ever more complex product requirements: The automotive industry relies on highly productive, flexible solutions for their manufacturing process. This is what we offer to renowned tool manufacturers and suppliers.**

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Many tool manufacturers tend to apply replaceable head systems for rotating tools such as milling cutters, drills and reamers. Due to our ability to hold tight tolerances we excel in manufacturing these replaceable head blanks.

In replaceable head systems, the shaft is usually made of steel, while the cutter is of high-quality, wear-resistant tungsten carbide. This construction allows the use of different tool geometries on a single shaft type, reducing set-up times and saving raw materials. Modular milling heads can reduce tool cost by one third compared to solid tungsten carbide cutters.

Using modern methods and the latest CNC machining centers in our preforming department, we produce precise, close-tolerance replaceable head blanks. Shaping grooves and cutting-edges or cooling channels and connection points, we can customize any tool to suit individual replaceable head systems.

The key to an accurate interface between the steel shaft and the replaceable head lies in the high-precision production of flat surfaces and threaded connections. Preformed flutes enable our

customers to reduce cycle times when they are grinding our replaceable heads. They rely on our expertise and value our accuracy.

## Preforms for the automotive industry



Replaceable head blanks with custom shapes, such as: cooling channels, grooves, centers and coupling systems

# GREATER PRODUCTIVITY FOR THE FOOD AND PACKAGING INDUSTRY

The valves used in the industrial homogenization of milk are subject to tremendous wear. Partnering with a Swiss leader in milk processing, we found several productivity-enhancing solutions.

Homogenization is the uniform mixing of components that are not soluble or have different viscosities. This process is an integral part of many industrial production sequences. The application of homogenization can also be found in the production of beverages, foods, dietary products, pharmaceuticals, paints, coatings and lubricants.

This process is energy-intensive and takes place at a working pressure of 150 to 300 bar. Homogenizing valves are subject to high wear due to pressure and continuous load.

**Food:** A leading Swiss milk processor uses homogenising plant supplied by a leading international manufacturer. By default, homogenising valves are made of steel. Our challenge was to reduce the high rate of wear. Using EXTRAMET tungsten carbide valves, the rate of wear was reduced to a third. This improvement affects the entire unit: the homogenising valve, the valve seat and the impact ring. The direct results of this improvement were an increase in productivity and a reduction in maintenance costs.

**Packaging:** The opening tabs in individual containers for coffee creamers are notched so that the consumer can open them with ease. The largest Swiss milk processor now uses tungsten carbide knives for this purpose, replacing the original knives made of steel


with a TiN coating. Using EXTRAMET knives not only increased service life but also removed the need for adjustment every two months. A substantial increase in production stability and the elimination of adjustment work gave our customers the cost and process optimization they had been looking for.

## A consumable food production component



Homogenizing nozzle. Homogenizing valve, valve seat and impact ring (from left)





«The wear on the homogenizing nozzles  
has been reduced to a third thanks  
to our development.»



A woman with short, dark, spiky hair is smiling broadly at the camera. She is wearing a black cardigan over a white t-shirt and blue jeans. She is leaning against a modern dental chair. In the background, there is a dental X-ray machine with a purple and white head. The scene is set in a bright, modern dental office with large windows.

«Tool life in medical technology has  
been significantly extended  
thanks to us.»



# BECAUSE PROCESS SAFETY IS THE ESSENTIAL THING IN MEDICAL TECHNOLOGY

**New materials in dental technology provide tools for demanding tasks. Because safety and accuracy must always be guaranteed during a medical procedure – even with materials that are difficult to machine.**

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In the field of medical technology, the requirements for tool components are particularly complex. New treatments such as minimally invasive surgery and material developments in nanotechnology always require new innovations.

For example, more materials are now being used for dental implants, but these are also increasingly more difficult to cut. Only an excellent tungsten carbide with an exceptionally even structure, consistent thermal stability and a constant transverse rupture strength may be used in these most challenging applications. Our tungsten carbide has already significantly extended the service life of machining tools used in dental technology.

Dentures should feel natural while guaranteeing the highest level of functionality. A high-performance ceramic called zirconium oxide has been able to meet these requirements. The material is considered to be the ceramic equivalent of steel, with a high fracture toughness and transverse rupture and tensile strength. Now, due to the abrasiveness of the material, zirconium oxide is presenting major challenges for the associated machine tools. To make machining more economical, special milling tools made of tungsten carbide have been developed, characterized by optimal geometries and special diamond coatings.

Working in close cooperation with our customers, we have developed a carbide that is outstandingly well-suited to diamond coating. Adhesion strength is ensured by a small number of additional carbides and optimized cobalt content. The selection of particle size allows the diamond layer to securely anchor the substrate.

## Blanks for medical components



Tool blanks for the dental industry (above), nozzles for dental systems (below)

# THE SPIRIT OF EXTRAMET

**The very highest level of precision, certified quality, knowledgeable customer service, and a sustainable attitude – that is EXTRAMET.**

## SUSTAINABILITY

Manufacturing tungsten carbide is energy intensive. The question therefore arises: “How sustainable can a carbide manufacturer be?” Our answer is: “In fact, very sustainable!”

Our company pays strict attention to closed circuits. The buildings are heated and cooled using energy recovered from our sintering furnaces. The water flows within a closed circuit. This is why our CO<sub>2</sub> footprint is zero – and because we combine our transports and compensate for everything else.

The sustainable recycling of carbide is of particular interest to us. Our supply chain goes from the raw material to tungsten carbide, from tool manufacturer to user, then via recycling back. At each step materials are recycled.

We invite our customers to participate actively. We offer them a recycling service that will re-treat secondary raw materials at our suppliers. This closes the loop to the end user and we also work together to use resources sustainably. Well-functioning cooperative projects confirm our commitment.

## SWISSNESS

EXTRAMET is the largest independent manufacturer of extruded tungsten carbide components in Switzerland. Our head office and manufacturing facility are located in the western Swiss Prealps.

Most of our staff come from the region and enjoy the benefits of living and working where others take their holidays. For the future we will continue with our location in Plaffeien, Canton of Fribourg.

Those parts of the micromachinery industry that are located in Switzerland (and have been our clients from the start) have always demanded high precision. As a Swiss company, like them, we provide the highest level of quality. From the outset we have implemented these standards of precision and accuracy and have constantly optimised them.

Switzerland is not only a country of traditions, but also of innovation. We enhance the quality of our products through the work of our research and development team, who are continuously refining our products. This improves our knowledge and understanding when applying this know-how.

EXTRAMET uses Switzerland’s innovative power to implement forward looking projects around the world, working together with science and industry.







## SERVICES

Quality and reliability are values that play a central role in our corporate philosophy.

Every day we work on reliable solutions for the challenges of our customers and markets. It may be a material analysis in our laboratories or full scale production of carbide blanks. There is no challenge too big or too small for us to undertake.

We create close-to-shape special blanks from tool drawings, 3D models, or the original parts.

We are available to offer you expert assistance on any questions and requests. We are able to develop solutions to our customers' daily challenges thanks to the many years of experience and the advancements EXTRAMET has made.

## CERTIFICATION

We guarantee a high quality standard across our entire production process – from extensive research in selection of suppliers to the continuous development and training of our employees. We stand by our customer-oriented approach to quality. In order to represent our company's strategic objectives to each individual customers, EXTRAMET has successfully been certified by the Swiss Association for Quality and Management Systems (SQS).

### **ISO 9001 – Certification of Quality Management Systems**

A high level of transparency within our organization is taken as a basis for the continuous improvement of our company. This enables us to fully and completely meet the quality requirements from our customers to the final user.

### **ISO 14001 – Certification of Environmental Management Systems**

For the sake of our environment, we are committed to fulfil the strict conditions for an environmentally friendly production process. These criteria apply across the globe, and are an essential part of our corporate sustainability management. This is our contribution to a clean environment.

### **ISO 45001 – Certification of Occupational Health and Safety Management System**

By increasing our safety culture, EXTRAMET can count on the competence of motivated staff, a key component of our quality products.

A man with a beard and tattoos stands in front of a large aircraft engine in a factory. He is wearing a black t-shirt and grey trousers. The engine is a large, complex metal structure with many blades. The background shows the interior of a large industrial building with a high ceiling and skylights.

«Thanks to us, drilling time has been cut drastically in fuselage construction.»



# SAFER, MORE EFFICIENT AND FASTER MACHINING OF COMPOSITES IN THE AEROSPACE INDUSTRY

A key factor for success in the aerospace industry is weight reduction. Passenger aircraft must become lighter and more efficient. The materials used in aircraft building provide tooling with new challenges.

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Twenty years ago the aviation industry was largely invested in using aluminum alloys. With the next generation of aircrafts such as the Airbus A320neo and A350, or the Boeing 787 Dreamliner and 737 MAX, a new range of materials were needed to machine composite stacks. They involve titanium alloys and complex composite materials such as Ti/SFRP or Ti/CFRP/Al.

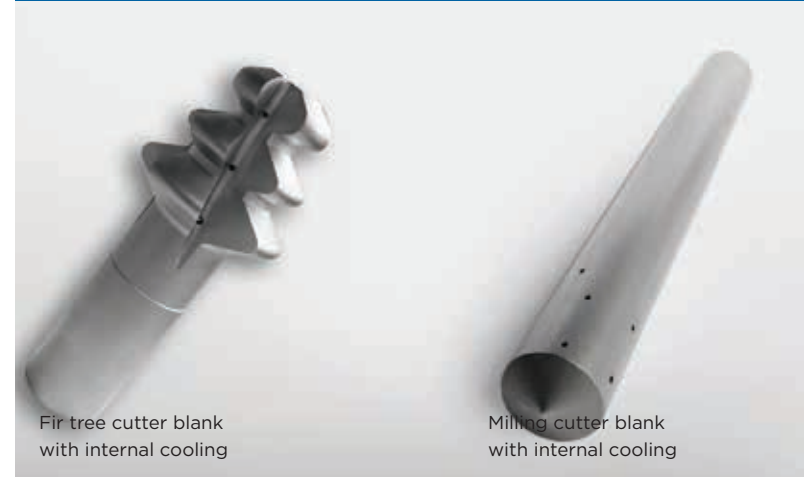
When machining these difficult composites you require a tool made of high quality tungsten carbide due to the vast difference in the properties of the different materials. This requires optimally designed tool geometry for machining, then if needed, a suitable coating. However, to get the best results, the base material – the tungsten carbide substrate – is a key factor for success. Due to years of cooperation with many partners in aircraft manufacturing, we were able to gain extensive knowledge in this area.

**Machining Ti/CFRP:** Our specially developed double step drills made out of EMT100 tungsten carbide were able to meet all the requirement for machining a Ti/CFRP composite without being coated. The tight drilling tolerance could be met in both carbon-reinforced as well as titanium materials.

**Machining Ti/CFRP/Al:** Coated tools have been significantly improving for years. When constructing the fuselage of an A380,

a diamond coated drill made of EMT100 is used to machine the pressure bulkhead. This meant that two processes (drilling and reaming) could be replaced by a single step. With this change an addition of 140 percent in service life was also achieved.

## Form blanks for the aerospace industry



Fir tree cutter blank  
with internal cooling

Milling cutter blank  
with internal cooling

# WATCHMAKING INDUSTRY WELCOMES A BRILLIANT RESULT WITH LARGE COST SAVINGS

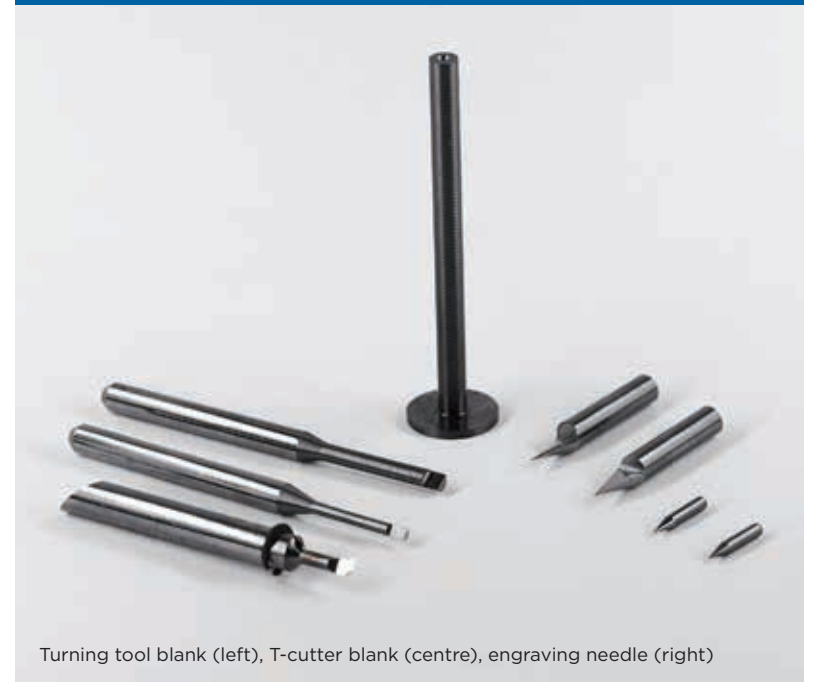
Until now, a Swiss watch company used wire eroded tools made of tungsten carbide for stamping out the surface structure of watch bezels. Using this method our partner was then only getting a tool life of 20–30 pieces. When they came to us they asked if we could find a solution that would not only give them a more economic result but also will offer a cosmetic appeal as well.

When producing watch components, efficiency is not the only variable to consider. Esthetic appeal is of equal if not greater importance, especially to the consumer. Once working closely with our customer, we developed a punch made of EXTRAMET tungsten carbide where the surface is left with a brilliant polish.

Now our punches have stamped out thousands of watch bezels without any traces of a flawed surface. Once manufacturing started with the new tool our customer was also able to increase the speed of production along with their consistency. Our clients have expressed their satisfaction: “The surface finish is excellent! Until now we never thought it was possible to have these brilliant results.”

In addition to the improved quality, the costs were reduced by 80 percent. These factors have led to the company manufacturing all of their complex tools from tungsten carbide and have selected us as their new solution partner for future applications.

## Blanks and parts for the watch industry



Turning tool blank (left), T-cutter blank (centre), engraving needle (right)



A man with short dark hair and a light beard, wearing a dark grey work shirt with blue accents and a watch on his left wrist, stands with his arms crossed in a workshop. Behind him are glass display cases filled with various watches. The scene is lit with soft, industrial-style lighting.

**«We have defined a new surface  
brilliance for stamping out  
watch bezels.»**

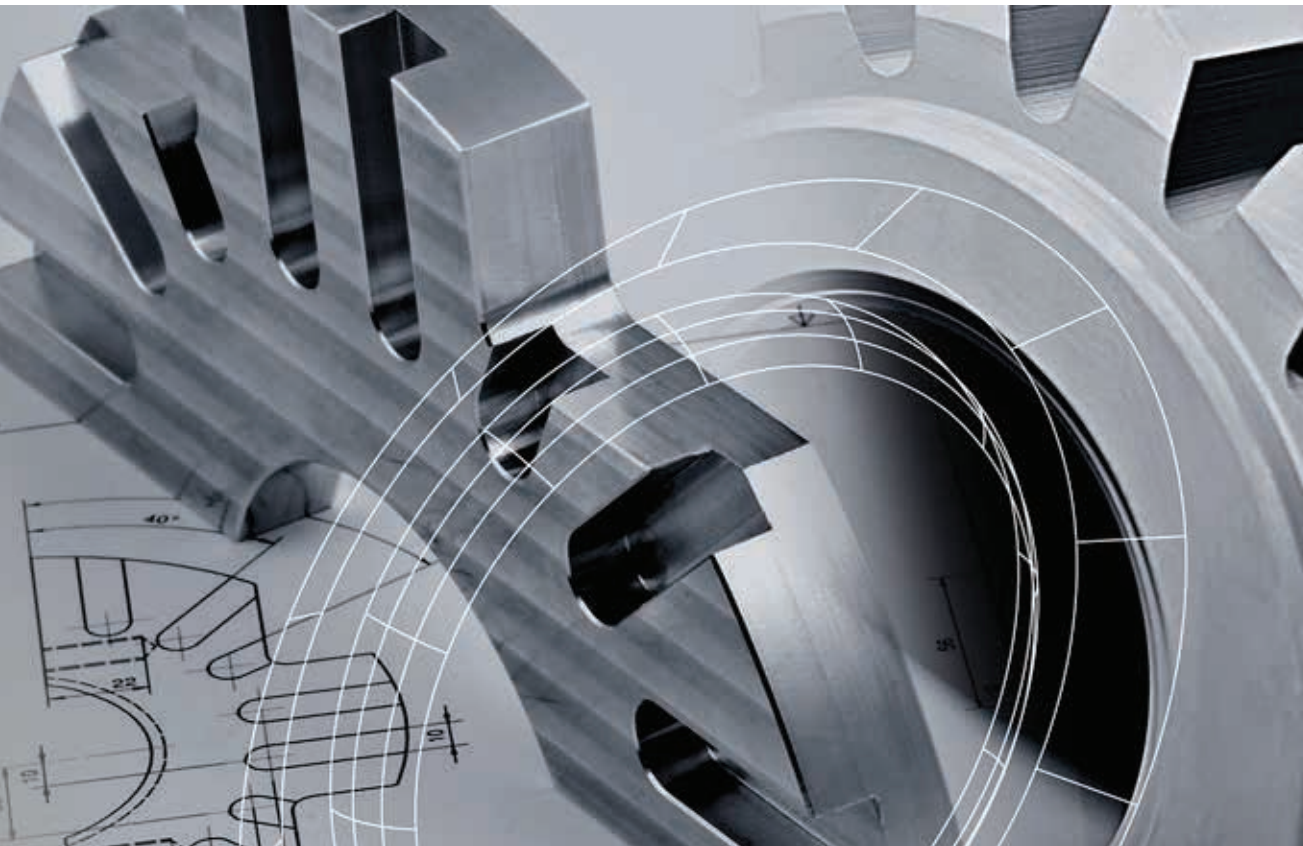
# TECHNOLOGY AND INNOVATION

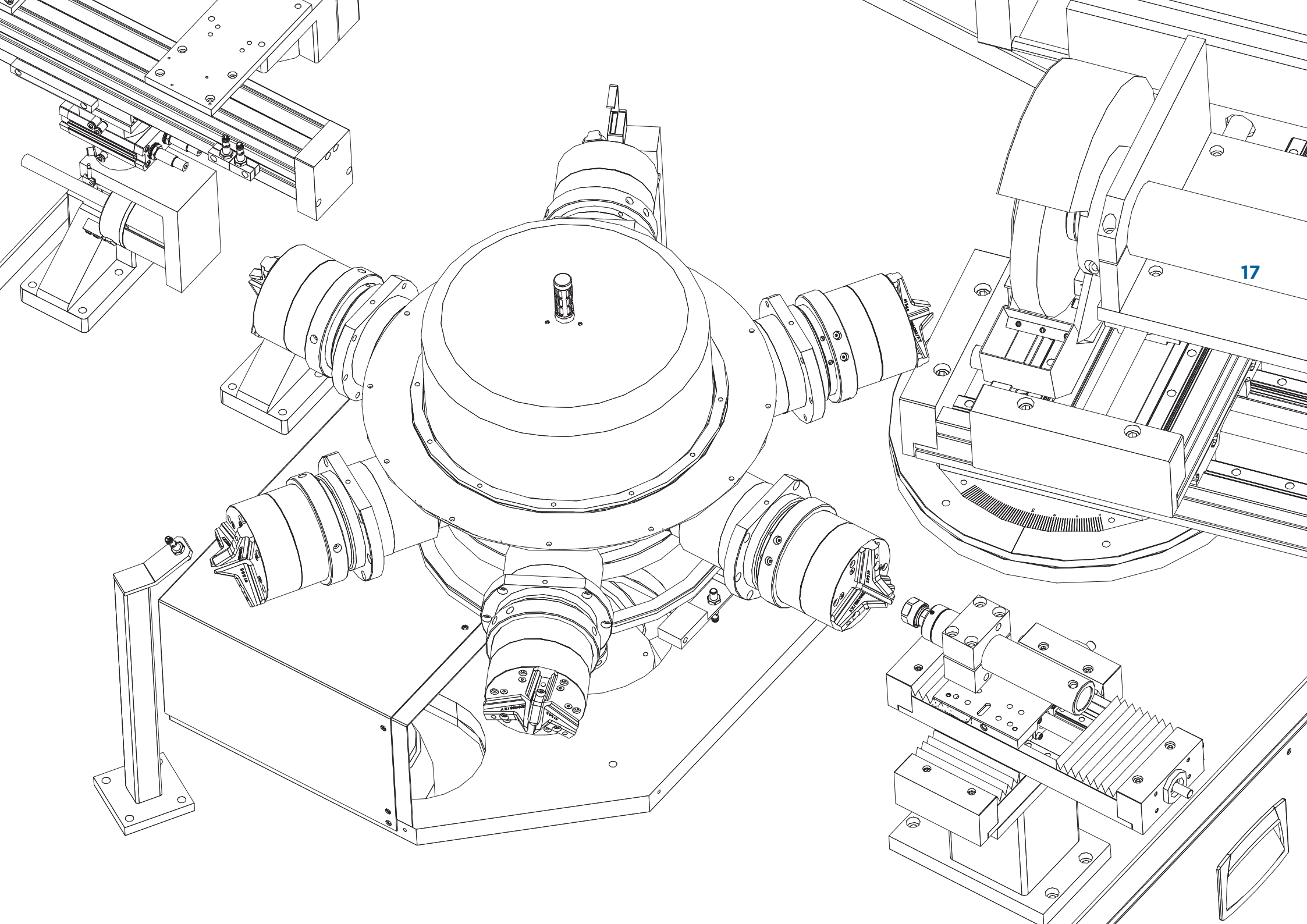
**We stand out from the competition by the highest quality carbide, our advancements with technology and our constant innovation.**

As a result from the relationships we build with our customers, we have evolved from a tungsten carbide manufacturer into a solutions partner for all the high-tech industries:

- In-house carbide grades development for special applications such as diamond coating (best adhesion and precision)
- In-house machinery production and processes for measuring, cutting, grinding, drilling and powder processing
- In-house automation team
- Efficiency is enhanced through common sense workflow routines
- Cooperations with universities and customers are important for product development and a critical part of our pledge of constant improvement
- Carbide specialist for the processing of materials such as aluminum, titanium, carbon fibre and natural fibres in light-weight construction
- Custom made products with enhanced performance and longer service life
- In-house R&D
- In-house laboratory with the capabilities to analyze any carbide material

Thanks to our years of experience and integration of the latest technologies, we are able to meet our customers' needs with a quality and consistent product.







# FACTS AND FIGURES

**EXTRAMET – the tungsten carbide manufacturer.**

**We have become of the top solution providers for the high-tech industry. Placing special emphasis on a sustainable supply chain. We go from the raw material to tungsten carbide products and back again through advanced recycling techniques and a high emphasis on green energy consumption.**

In addition to facilities for the production of high-quality carbide, we also have the latest generation of machines in the fields of “molding” and “finishing”. Our corporate mission means that EXTRAMET high-tech products are complemented by economic, ecological and social responsibility. Our goal is to bring added value to our customers with the innovative strengths to meet the increasing global challenges of the future.



## Independent family business

<b>Founded:</b>	1980
<b>Founder:</b>	Otto Mihm
<b>Location:</b>	Plaffeien, SWITZERLAND
<b>Business sectors:</b>	Automotive industry Dental and medical technology Electronics industry (LED / PCB) Power engineering Food production Aerospace Machine and plant construction Measuring and testing technology Microtechnology Engine manufacturing Safety technology Packaging industry
<b>Employees:</b>	180
<b>Vocational training:</b>	Industrial Ceramists Commercial Logisticians Polymechanics

For more information please ask for our detailed product information or send us your request:  
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