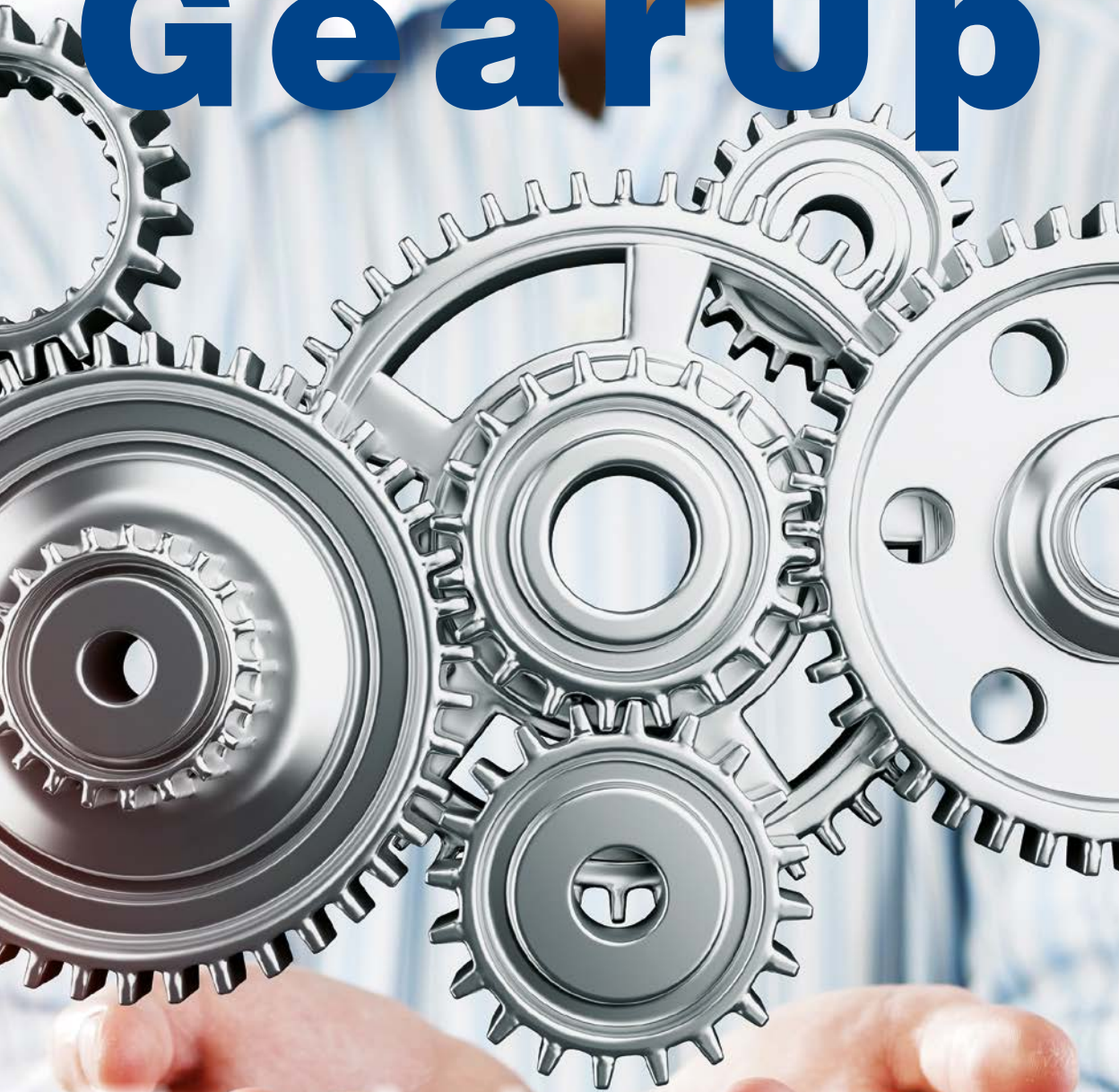


# GearUp



The whole gear world in your hands



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# The whole gear world in your hands



Dear reader,

The new edition of our company newsletter starts with a slogan which is of fundamental importance to us. With the recent acquisition of the former Samputensili Cutting Tools in Europe, Star SU has become a truly global player in the gear cutting tool market. From North America to South America, from China and India to Europe, you are in good hands with the Star Cutter family of companies and can rely on us as a single technology source for your gear manufacturing needs across the globe.

At the beginning of this edition, we illustrate several new technological developments in the manufacture of cylindrical gears. In fact, interesting application-related articles, customer profiles and interviews to our top management are just a few of the treats in store.

We hope you find this new edition of GearUp interesting and stimulating for your own business activities. As usual, we would welcome your comments and suggestions so that we can craft the next edition to perfection. While there is a great deal to be done, we are thankful for your continuous trust and look forward to continuing working with you.

Enjoy the read!

Jeff Lawton  
President and COO of Star Cutter



# Your global partner for skiving tools

A major part in the gear manufacturing process is the soft machining of gears and splines. The choice of the soft machining process depends on the component geometry, the required quality as well as the productivity. In the automotive and commercial vehicle sector, hobbing, shaping and broaching are the dominating processes for soft machining of gears. However, over the last few years, the technology of gear skiving has been experiencing a renaissance.

With the newest developments in machining (direct drive and stiff electronic gearboxes) and tooling technologies (complex geometry, material and coating), the skiving process starts to compete with the well-known broaching and shaping processes, mainly for internal gears.




Skiving is defined as a continuous cutting operation that uses a tool design like a helical shaper cutter. A great advantage of this technology is that it can be used with many gear applications, including involute gears, non-involute gears or non-symmetrical gears.

The process is extremely flexible, reduces cycle times and eliminates unproductive upstrokes due to the synchronization of the cutting tool and workpiece. Another

advantage in using this technology is the possibility to perform the machining of internal or external gears without the need of an undercut or groove.

With the current changes within the automotive industry regarding the vehicle electrification, the demand of high-precision gears will decrease significantly because the traditional surrounding for gear manufacturing is in the middle of an upheaval phase. The new generation of e-drive transmissions will focus on lightweight designs that also has an impact on the gears themselves. A common way in gear designing was to keep a certain focus on the manufacturability with the traditional processes like hobbing or broaching. But having the lightweight factor in focus, the design of the gears will not be the easiest to machine with the traditional



	Hobbing	Shaping	Broaching	Skiving
External gear 	High Productivity	Low Productivity	No use	High Productivity
External gear with interfering contours 	No use	Low Productivity	No use	High Productivity
Internal gear 	No use	Low Productivity	High Productivity	High Productivity

gear manufacturing processes. Several gearings on one component, which have to be oriented to each other or other secondary functionalities close to the gear stage, are common design elements of current and future e-drive transmission components. At that stage, the skiving process and all its flexibilities regarding profile and lead corrections, as well as the possibility to use it for gears with interfering contours, will replace the well-known gear manufacturing processes more and more, not only for internal gears. Although the cutting tool consumption in gear manufacturing will decrease with the rising vehicle electrification, the skiving technology will be a winner of that environmental change.

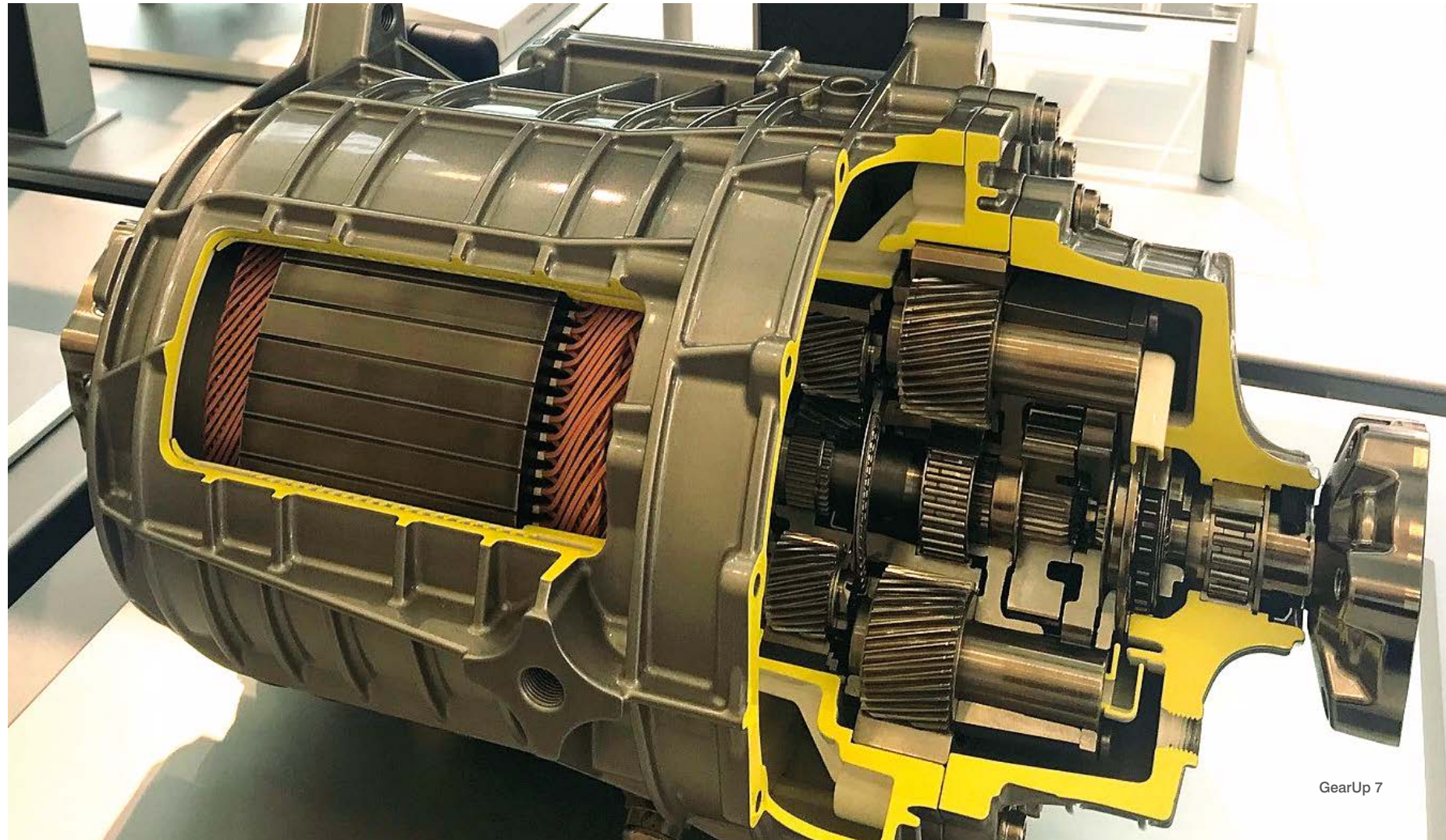
To face these upcoming challenges in the best manner, Star SU is offering the best skiving tool technology which is available in the market. Due to the long experience on a huge number of different applications, the skiving process is not an unknown area anymore. During the development of the tool technology and the test of different cutting materials, we lifted the skiving process to the next level where it is not only competing with shaping and broaching, but also with hobbing for external gears. Today, skiving

plays a crucial role in gear manufacturing and, with the newest carbide technology combined with the dedicated surface treatment, our tools make skiving a leader in quality and productivity.

The competence for skiving tools at Star SU begins in the designing phase. Using software solutions which were developed in-house offers us the possibility to find dedicated design solutions not only for involute gears but also for special splines and sprocket chain gears. Our experts are capable to develop perfectly fit skiving tools far beyond the standard. Additionally, Star SU uses newest tool grinder technologies to ensure highest manufacturing qualities

for all our gear cutting tools. Our skiving tools are ground on Star Tool Grinders like the NXT and PTG series. Dedicated grinding cycles combined with the newest software solutions allow us to manufacture helical and spur skiving tools in conical or cylindrical shape. Our global customers are using Star SU skiving tools up to module 6 made from HSS or carbide.

Our continuous developments make Star SU the perfect partner for customers who are using the skiving technology as a profitable alternative to the traditional gear manufacturing processes and are well-prepared for the rising electrification in the automotive technology.



# High-precision 3D designing for gear skiving

Due to the high efficiency and flexibility in design, transmissions are used in all kinds of powertrain applications for different industries. The main component in a transmission is the gear, which can be used in various designs and sizes. In the past, different processes and production chains have been established to be able to produce the gear in a highly productive and precise way. The most common processes for the soft machining of cylindrical gears are hobbing and shaping. In addition, over the last years, the gear skiving process has been undergoing a renaissance.

Gear skiving is a continuous cutting method in which the cutting speed is generated by the inclination angle  $\Sigma$  between the tool and the workpiece. Skiving combines the benefits of not having the limitation of interfering contours, as in the hobbing process, with the absence of necessary return strokes, as in the shaping process. Thanks to these aspects, skiving can be a process with lower cycle times and less limitations than hobbing. Furthermore, it can be used to machine external as well as internal gears, which shows the flexibility of the process. Another advantage is the possibility to realize lead corrections like crowning or lead angle corrections by adjusting the machine movements.

Although initially introduced as an alterna-

tive to shaping or broaching for the manufacturing of internal gears, skiving proved to be a high-productive alternative for external gear manufacturing as well. Therefore, the number of installed skiving spindles in the market is significantly increasing. During the process itself, the tool takes a key position by being the interface between the gear and the machine. Moreover, with the rising requirements for higher precision and tighter tolerances on the gear, the tool plays an even more crucial role.

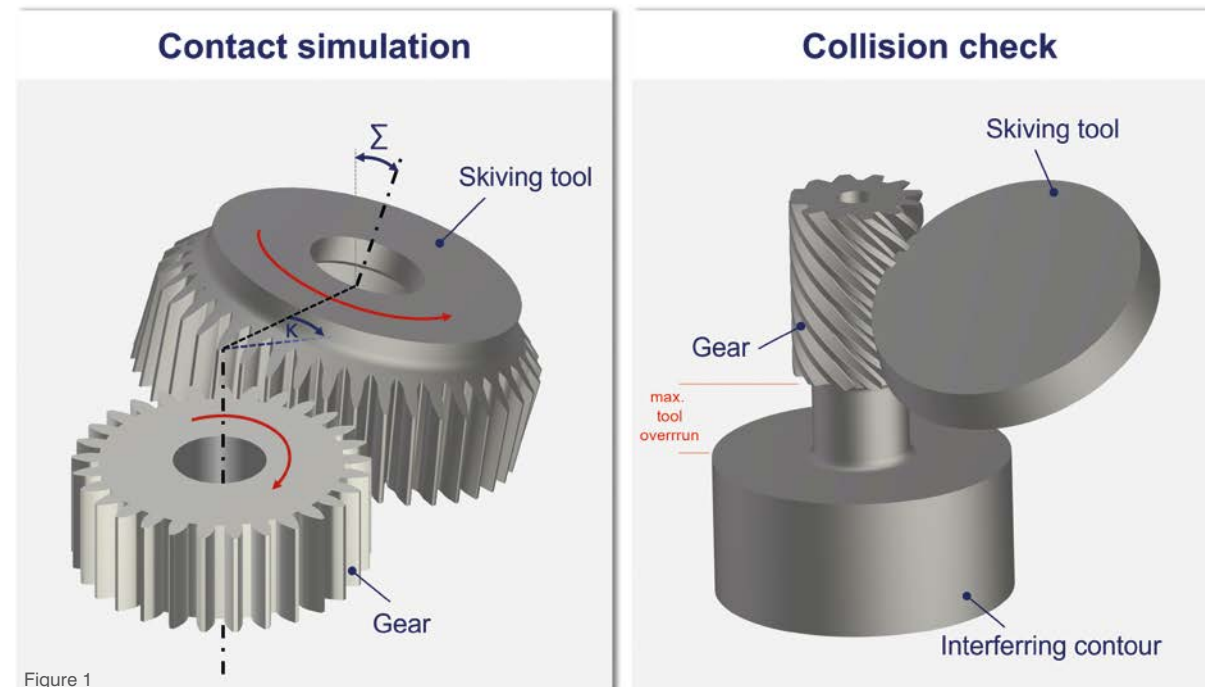


Figure 1

## Figure 1 - The skiving process as 3D model

Having said that, the mandatory aspects for a successful skiving process are the tool characteristics and its geometry. The tool manufacturer needs to be able to generate the dedicated tool profile for the gear to skive and combine the know-how with the necessary grinding technology, thus producing a tool with the required accuracy. This has led Star SU to develop a new designing routine, to combine the well-known expertise in the design of shaping cutters with the existing manufacturing processes that have proved to be successful for a long time.

Before examining the perfect profile for an accurate tool design, it is necessary to carefully study the collision between tool, gear, toolholder, clamping devices and other elements. Such a collision check might already give the designer a good fit for the tool's

macro geometry. Figure 1 shows the use of the 3D approach for skiving tool designing. As shown in the example on the right-hand side, also interfering contours close to the gear, like shafts or the clamping, need to be considered during the designing phase.

The 3D approach offers our engineers the possibility to make a detailed check of the skiving process and gives a clear picture about the machining situation for which the tool will be made. As soon as all dimensions like diameter, number of teeth, helix angle and the other characteristics are decided, a deeper analysis of the tool's profile is needed.

The profile will be calculated by a dedicated subroutine which considers the kinematics during the skiving process and the penetration between gear and tool. In the following step, the theoretical tool profile will be transferred into a manufacturing simulation to evaluate the grinding process of the tool. This check, shown in figure 2, simulates the grinding process by considering the machine kinematics and the grinding wheel shape including the radii on the wheel. The result of this step is the achievable skiving tool profile which might differ from the theoretical ideal one.

### Figure 2 - Grinding simulation for tool profile calculation

The manufacturing subroutine will be carried out to have a clear result of the feasibility of the generated tool profile or even more, to understand the deviations from the ideal gear that the skiving tool would realize. This simulation will now follow the skiving kinematics to generate the gear in a penetration simulation, which in turn generates a gear model skived by the tool design which was calculated before.

To offer the tool designer as well as the customer a clear picture of the expected accuracy of the skiving process, a virtual inspection machine checks the profile of the simulated gear. Thanks to this, any error which could come up during the wheel calculation or the grinding process will be immediately detected and avoided.

This approach offers an inspection chart of the gear model by using the generated tool profile, as shown in figure 3.

The tool designer has now the opportunity to add corrections on the tool and wheel profile to improve the gear accuracy and find the best solution for the customer's demands. Furthermore, the result of the virtual inspection machine shows the customer any critical areas on the gear profile, like the transition between involute and tip chamfer.

It is therefore possible to have a clear check if the required form diameters will be respected, protuberance or tip chamfer will be formed correctly, or other profile corrections will arrive to the gear as expected. During the tool approval process, our customers will have a clear picture of the gear accuracy which the tool will achieve.

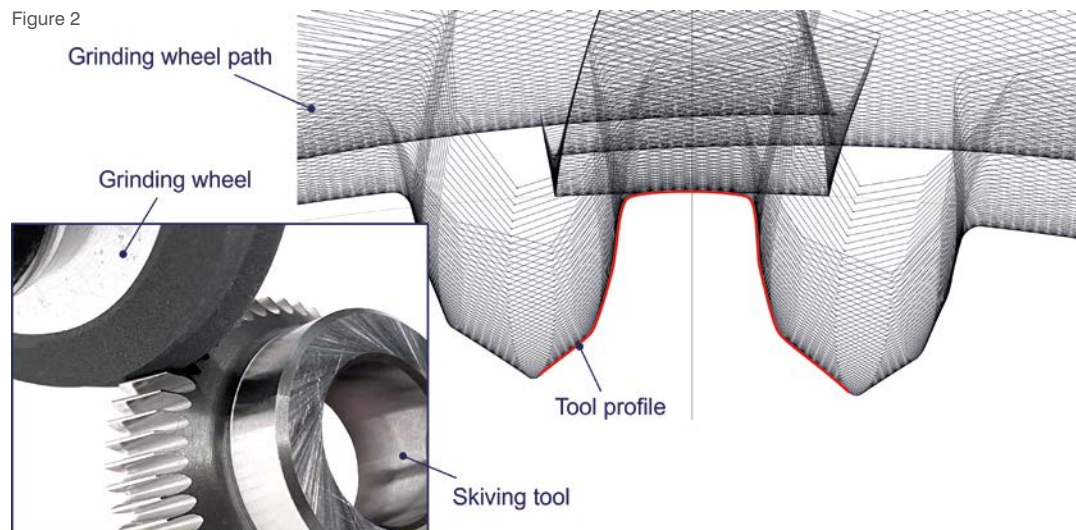


Figure 2

### Figure 3 - Virtual profile inspection of the simulated gear

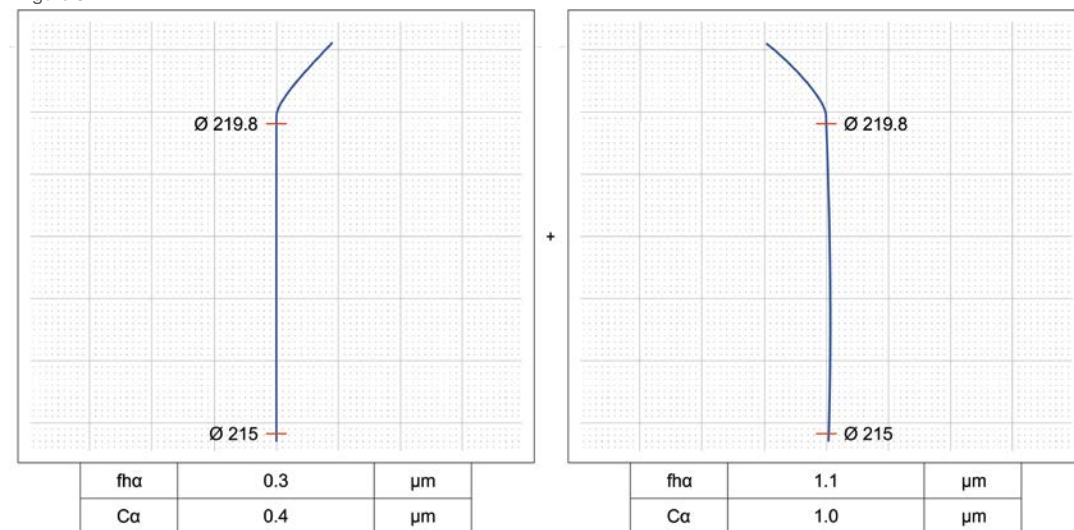
Having reached the final profile for the skiving tool, a check of the situation at the cutting edge itself is mandatory. To optimize the cutting process, e.g. to avoid critical conditions which would result in a low tool life, we analyze the clearance angle situation during chip formation while skiving.

For this analysis, the 3D subroutine simulates the path of the cutting edge through

gear's gap in sequentially different steps. In combination with the 3D model of the tool, the subroutine shows the designer the actual clearance situation between tool and part and can detect any critical conditions.

Figure 4 shows the penetration of the tool with a gap of the gear during skiving. During this check, the model of the gear and the tool are performing the skiving movement and the system will indicate if a low or even a negative clearance angle along the cutting path will occur.

Figure 3

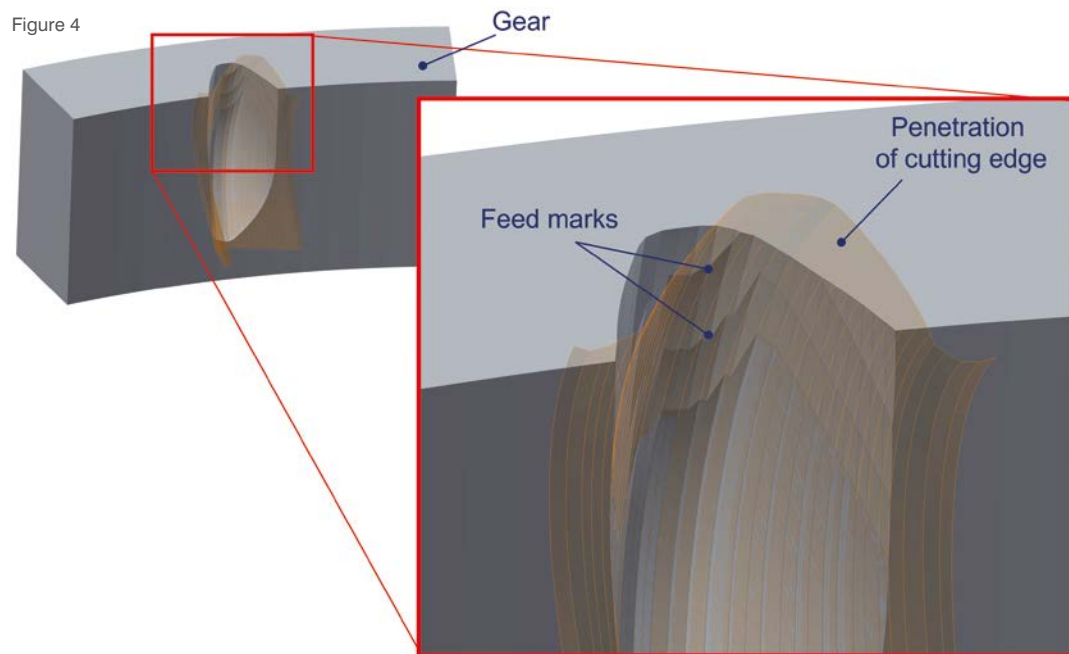


### Figure 4 – Analysis of cutting conditions during skiving

If the entire design gets the approval from our R&D department as well as from customer's side, the tool will be produced and later go on to the skiving spindle. At this stage, the 3D approach offers our application engineers a powerful tool to assist customers in their skiving applications. Due to several circumstances, the customer might see profile angle deviations on the gear which can occur due to displacements coming from forces or process dynamics.

The customer's goal may be to reduce the impact on the profile quality as much as possible. But besides deviations, a customer might also request to realize a particular profile angle correction to compensate heat treatment distortion which may occur along the process chain.

In the past, for both cases, the tool needed to be sent back to the supplier's premises, where it had to undergo a time-consuming reprofiling. Today, however, using the 3D approach combined with the virtual inspection machine, Star SU can offer precise machine correction values to correct the gear profile according to the customer's needs and demands.



### Figure 5 – Profile correction during skiving

Figure 5 shows the way of profile correction by using adjusted working angles. In the shown case, the skiving tool was producing a gear with  $f_{ha}$  deviation of  $0.3 / 1.1 \mu\text{m}$ , which was according to the tool design.

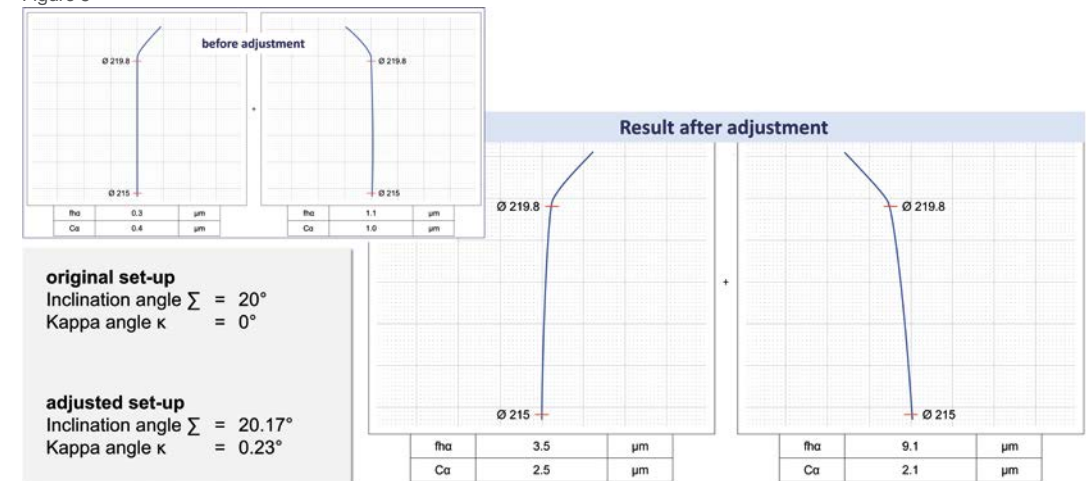
After starting the production, the request was to add an asymmetric profile angle correction of  $f_{ha} = 3 \mu\text{m}$  on the left and  $f_{ha} = 9 \mu\text{m}$  on the right side. With the 3D approach, a new working position of the tool was defined to produce the gear including the requested corrections. For this, the working angles of the skiving machine were adjusted to work with a new inclination angle of  $\Sigma = 20.17^\circ$  instead of  $20^\circ$  and adding a Kappa angle of  $\kappa = 0.23^\circ$ . The Kappa angle  $\kappa$  defines the position of the tool relatively to the gear. A Kappa angle  $\kappa = 0^\circ$  means that the

tool is positioned in the cross-axis point. By changing the Kappa angle  $\kappa$ , the tool moves along a circular path relatively to the gear and works with a displacement from the cross-axis point.

The new working position offered the possibility to produce gears with the new requested modification. With the help of the 3D approach for skiving tools, our engineers were able to offer precise correction values and the customer avoided to send the tools back for reprofiling.

With our newest software, Star SU is offering the market high-precision skiving tools, which will produce the gear exactly as needed for high-quality requirements. In addition, we are using these software tools to support our customers to find the correct skiving process which best suits their needs along the entire tool life.

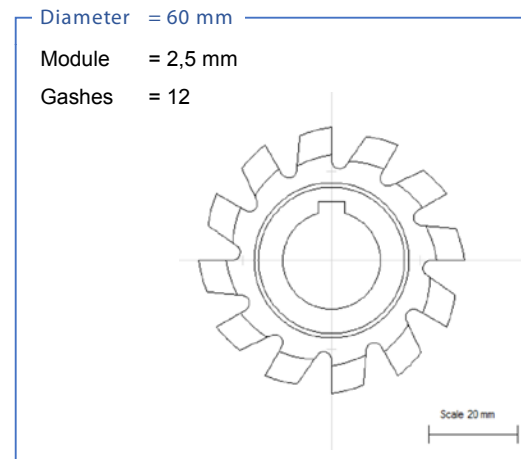
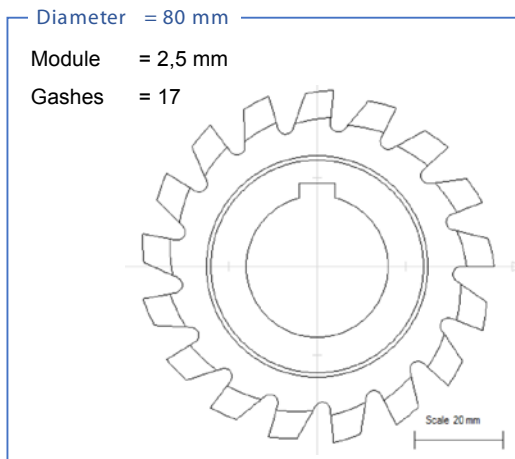
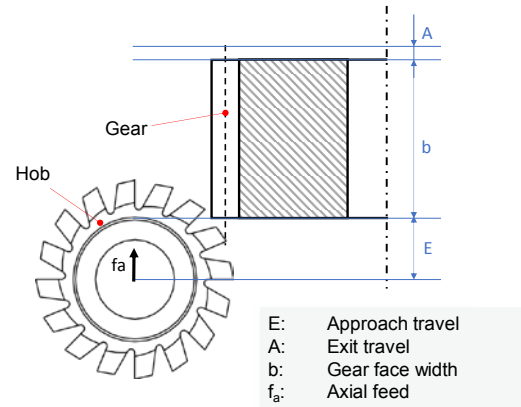
Figure 5



# How do we choose the dimensions for your hob?

The question about the chosen size of a hob does not have just one single answer. It depends from several boundary conditions for the particular application.

The hob diameter must be chosen to provide the required space and stability for the teeth and taking into account whether it is a bore-type or a shank-type hob. Furthermore, the hob diameter has a direct impact on the productivity of the process. The picture below shows the different travel path sections a hob has to go through during gear cutting. Besides the gear face width  $b$ , the hob has to travel through the approach length  $E$  and the exit travel length  $A$ . In particular, the approach length is impacted by the hob diameter. To increase the productivity, the relation between  $A+B$  should be as small as possible.

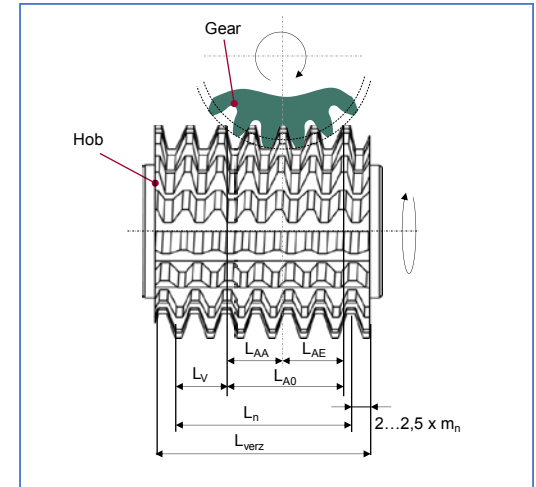


At the same time, a smaller hob diameter leads to a decreasing space for our gashes. Our example in the next picture shows two different hobs for the same application for a module 2,5 mm gear. The hob with a diameter of 80 mm has 17 gashes.

To ensure the same amount of grinding stock on the 60 mm hob, the number of gashes has to be reduced to 12. In case the hobbing application is set-up to generate the same maximum chip thickness, the tool with a smaller number of

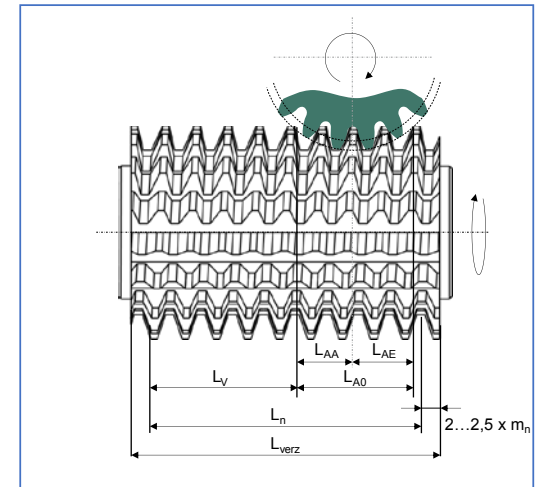
gashes needs to run with a lower axial feed which also could impact productivity. Furthermore, less gashes mean a smaller number of teeth in contact which in turn reduces the possible numbers of gears to be cut until the hob needs to be reconditioned.

Once the diameter is chosen, the hob length needs to be defined. First, it is important to be able to cover the full penetration length between hob and gear  $L_{A0}$ . Additionally, on the left and right side of the hob, a certain security value needs to be added which is in the range of 2 to 2,5 x module. With such a hob, it is now possible to cut the gear. But to increase the tool life, a shifting length  $L_v$  is needed which allows to cut the gears on different hob positions, levelling the tool wear along the tool length. Simply put, with a longer hob, more teeth can be realized and used to cut the parts.



The total hob length will depend on the customer's needs. If the customer is looking to produce a low number of gears or just prototypes, the hob can be smaller. But if a big batch or a serial production shall be realized, the hob length needs to be increased to be able to cut as many gears as possible before the tool needs to be reconditioned.

Both parameters, hob diameter and length, have an impact on tool cost as well. Therefore, our customers wish to receive a dedicated tool, designed and manufactured according to their needs, offering the best tool life for the application but also keeping the investment as low as possible.



Finally, further boundary conditions for the hob dimensions can be the hobbing machine, the clamping, or the gear itself. If one of these parameters gives a limitation for the tool size, this must be respected, and the best compromise needs to be found. To do so, the tool supplier needs to stay in close contact with the customer and to analyze the application in detail.

Our long-standing experience in being the interface between the tool, the machine and the gear itself gives Star SU a huge know-how to offer the best hob dimensions to our customers, achieving the highest productivity and longest tool life according to their needs.





# Motovario, where motion comes to life

Italy's region of Emilia-Romagna is home to beautiful towns full of history, such as Bologna, Modena, and Ravenna. This spectacular area also hosts the district that is commonly known as the "Power Transmission Valley", home to Motovario, one of its most prestigious and historical companies.

Founded nearly 60 years ago by the entrepreneurial idea of a businessman in Formigine, a small town in the Modena surroundings, Motovario started as a

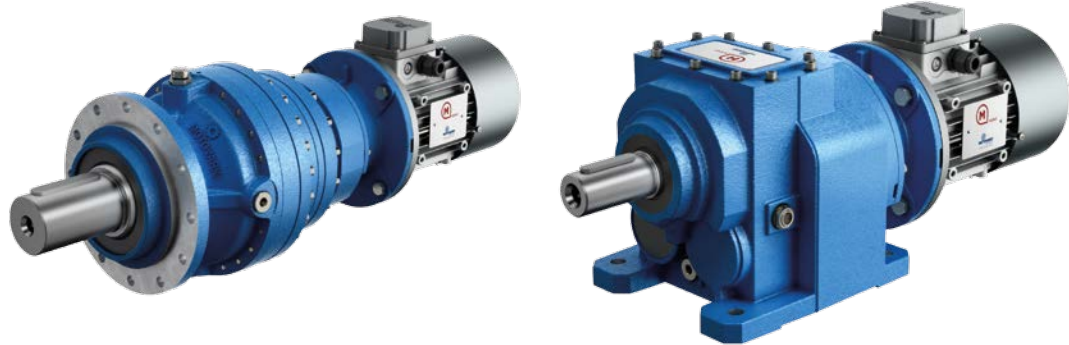
supplier to the nearby Sassuolo "Ceramic District", where major companies of this industry are located, allowing a nearly vertical worldwide growth and recognition.

Motovario was then sold to an investment fund and finally became part of the TECO Electric & Machinery Group in 2015. The inclusion into the TECO Group created many synergies and benefits for Motovario in terms of international footprint, especially in the fast-growing Asian markets, and the opportunity to integrate the traditional mechanical products with electronics offering mechatronic power transmission solutions to the market.

"Since the very beginning of its activity, Star SU Europe (formerly known as Samputensili) has been the ideal partner for Motovario in the supply of gear cutting tools", explains Federico Picchio, Sales



Franco Pacini, CEO of Motovario



## ACTION *the DNA of our heart of motion*

Director of Star SU Europe. “The resulting commercial relationship is based on a close technical cooperation and the constant lookout for the best manufacturing solutions for high-quality gearboxes.”

Graziano Paganelli, Sales Area Manager of Star SU Europe, continues: “Star SU can supply the whole range of tools for the manufacturing of cylindrical gears and bronze crown gears. Over the years, we have always supported the growth of Motovario, paying great attention to the customer’s technical requirements and following every project down to the smallest

details. The relationship between our companies has naturally grown because of the ease of communication among the various departments, the continuous support in the tool optimization and the choice of the best cutting parameters.”

In the Research & Development area, the two companies have reached their maximum level of cooperation, making concrete and ambitious objectives become a reality: the designing of reliable and efficient tools for high-quality gears on extremely short notice.

Last but not least, many employees at Motovario have successfully attended the Star SU Europe technical seminars, which provide a valuable support in the everyday manufacturing activities.

Franco Pacini, CEO of Motovario, explains: “Our favourite Motto is “Heart of Motion”, and while our heart is strongly rooted in the Formigine area, Motovario has become an international recognized brand, with application in several industry fields, direct presence in many countries and worldwide global partners selling our products in all continents.”

Motovario incorporates its values in the acronym ACTION, and such values drive their employees’ daily activities, since they are **AMBITION**, **FOCUS**ed on **CUSTOMERS**, they act as a **TEAM**, their **INTEGRITY** is undoubted and they continuously promote **INNOVATION** at all levels.



“The secret of Motovario’s success resides with our legacy, with our product offering and with the passion of our people”, concludes Pacini. “Motovario is ready to answer to the evolving market and customer needs in the power transmission industry.”



**DIDIMO ZANETTI**  
GEARS MANUFACTURER SINCE 1953



# Didimo Zanetti: We take care

Traditionally associated with rich cuisine, medieval architecture and the oldest university in the world, Bologna is also home to other kind of jewels.

One of them is Didimo Zanetti, which since 1953 has been manufacturing bevel gears, shafts and gear components, serving demanding applications of renowned global OEMs, from agricultural, construction and

commercial vehicles to high-performance racing cars.

Didimo Zanetti is a dynamic company with technological innovation, efficiency, per-

formance, and quality at its core. A strong partnership culture and the respect for those who purchase and use their products are at the heart of the great relationships the company developed over the time with their global customers.

Blending the experience of highly qualified personnel with the best production and testing equipment available in the market, Didimo Zanetti fully expresses the world-class excellence of the renowned "Motor Valley" around Bologna, always delivering precision, reliability and care to its customers.

We have interviewed Michele Gualandi, Plant Manager at Didimo Zanetti.



*Mr. Gualandi, why did you choose Star SU Europe?*

"We have been working together for over 30 years, relying on your company for the supply of gear hobs, shaper cutters and

shaving cutters. One of the main advantages for us is having only one supplier for three families of gear tools, independently of the cutting process we opt for in our everyday manufacturing activities.”

*How did Star SU Europe contribute to the success of your company? Can you make some practical examples?*

“Thanks to the close cooperation between our Technical Offices, we have achieved important results, such as the designing and manufacturing of shaper cutters with very complex profile corrections. In addition, over the years, your company has helped us make tests with new coating materials (Alcrona, Altensa, etc.). Of course, the relationship has also been continuous due to the local presence of your excellent Service Centre, which has always taken care of the sharpening, reprofiling and recoating of our



tools. I am glad to acknowledge that there has been a technological exchange between our companies, in both directions. We have built a strong human and professional partnership, which results in mutual respect, absolute trust and high confidence.”

*What are your future plans?*

“This year marks our 70<sup>th</sup> anniversary, a milestone that we are particularly proud of. At Didimo Zanetti, we consider a specific responsibility to serve our customers as best as we can, leveraging the investments relentlessly deployed in our facilities and always working with professionalism, dedication and care. We work every single day with strong ethical principles, putting human touch and care in everything we do, sharing the professionalism and passion that made of the Bologna “Motor Valley” a renowned world-class excellence.”





# Star SU Europe

On 1<sup>st</sup> July 2022, Samputensili Cutting Tools became part of the Star Cutter Group of companies, changing its name to Star SU Europe and doing business under the Star SU brand.

The Star Cutter Group of companies, originally a maker of gear hobs for the Detroit automakers in 1927, has grown to be a global manufacturer with over 600 employees producing gear tools, round tools, machines and carbide.

Jeff Lawton, President and COO of Star Cutter



On this occasion, Jeff Lawton, President and COO of Star Cutter, has stated: "Integrating the global reach and resources of these companies into the Star SU organization expands our ability to better serve customer in all areas. It will further our technical skills, enhance our product quality, expand our manufacturing capacity and improve our service offerings".

Andreas Blind, President of Star SU Llc., has explained: "We combine business consulting, tailor-made solutions and technological proficiency – and we are able to bring all these services to customers thanks to our team's diverse range of expertise."

With a presence in North America, South America, China, South Korea, India and Europe, you can rely upon Star SU as a single technology source for your gear manufacturing needs across the globe.

Andreas Blind, President of Star SU Llc.



# Alex Simioni

Let's meet Alex Simioni, Member of the Star SU Board of Directors and Managing Director of Star SU do Brasil.

Alex is a passionate, action-oriented and experienced leader, with a broad sales expertise in the field of round tools, gear cutting tools and gear manufacturing machines.

Alex had his relationship with Star Cutter Co. started in 1995 and since 2013 has held progressively responsible roles at Star SU, working across the organiza-

tion on key priorities in sales, production, customer service and strategic planning. He holds a Master's Degree in Business Administration (Fundação Getúlio Vargas), a Bachelor Degree in Business Administration (Universidade Metodista de Piracicaba), and a Mechanical Engineering Degree (Escola de Engenharia de Piracicaba). He is fluent in English, Spanish, and Portuguese.

*Alex, what development projects does Star SU do Brasil have in store for the future?*

Star SU do Brasil is a very important piece of the Star SU organization and we have several projects supporting the Star SU brand mark worldwide. The market is going through dramatic changes since the automotive electrification and demands from generations Y (Millennials) and Z and we are prepared to deliver tools that meet these demands and technologies.

*Your company has very high standards of quality and reliability. What is the secret of your success?*

There is no secret. Quality and reliability are the result of stable processes and dedi-

cated people. Our team counts with the best professionals that work as an "orchestra", each one giving its contribution at its time and extent. I would be unfair not to mention the contribution of my former colleagues in creating such a fruitful environment.

*What is the best business advice you have ever received?*

Advice arrives from everywhere and everyone, and all of them have their value. However, the piece of advice that I consider most important is: "Don't do unto others what you don't want done unto you!" (Confucius). This advice fits any interpersonal relationship, from business to private life.



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# Federico Picchio

We are pleased to introduce Federico Picchio, Sales Director of Star SU Europe.

Federico is an extremely focused, committed and solution-oriented leader, with an exemplary track record of success in sales and business management. He holds a Master's Degree in Mechanical Engineering from the University of Bologna and has worked at our company for almost 20 years.



When talking about his experience in our company, Federico comments: “20 years in a company are an extremely long time span, especially nowadays. I must admit that many things have happened, and I have had the chance, the luck and – why not – also the ability to ride the changes, to learn and to grow up inside the company, always finding the right motivation. I started working

for Samputensili in July 2002 as a Product Manager for gear grinding and screw grinding machines. At that time, the company had a business unit focused on the production of grinding machines, its know-how coming from the tool grinding business. After three years, I had the opportunity to take on the sales responsibility for some countries as Export Sales Area Manager thanks to the technical knowledge accumulated in the previous years, my strong foreign language skills and my dynamism, curiosity and personal attitudes in “public relations”. Over the years, I had the chance to follow the sales in several European countries extending my responsibility also to the tool sales until 2007, when I received the proposal to move to the US to support our JV, Star SU LLC, to sell Samputensili products in North and South America. In 2009, back from Chicago, I took over and developed the business in Middle East, East of Europe and Russian Federation until 2016, when Samputensili divided its business into two companies, Samputensili Cutting Tools and Samputensili Machine Tools. Standing at the crossroads, I decided to follow the tool business becoming the Regional Sales Manager of Southeastern Europe, until Star Cutter took over the company and put me at the Head of the Sales Department.

*Federico, what are your future plans for the European market?*

The European market is a very competitive, demanding and crowded market and this makes the challenge very interesting. Every country has its own dynamics, require-

ments, and competitors according to its own history. The first thing to do is to build up the right sales organization in order to support every single market and tailor-make the strategies as much as possible. That is why, for example, in 2022 we have started working with Stefan Rang, our experienced sales representative for Germany, Austria and Switzerland.

*How will your customers benefit from the new ownership of the company?*

In addition to speeding up all decision-making processes, a single ownership for all Star SU companies will allow for a better synergy between the 7 production plants around the world, opening the sharing of skills, from designing to manufacturing. This leads spontaneously to an improvement in the final quality of the product. Since we work in an increasingly globalized economic

context, it goes without saying that the more we are able to be a “global company”, the more successful we will be.

*What are the main innovations your customers are more interested in?*

The answer to this question is very “simple”: whatever allows to cut a gear in the shortest time with a better quality reducing the cost per piece! This is the challenge that all tool suppliers must rise to. How to do it? By investing in research and technology.

*How important is quality in your daily production?*

Quality, in its most holistic sense, is the basis of everything. This is even truer today and will be more and more so tomorrow: there is no escape. Personally, I would never work for a company that didn't have this concept very clear.



Federico Picchio shakes hands with Stefan Rang, our sales representative for Germany, Austria and Switzerland



The topics covered by our seminars can be grouped in the following categories:

- Theoretical fundamentals of (cylindrical) gears;
- Manufacturing methods of gears;
- Quality standards for gears;
- Reading control charts for gears;
- Necessary parameters for a correct designing of tools;
- Reading a tool drawing and understanding its quality standards;
- Reading conformity certificates for tools;
- Materials for the manufacturing of tools;
- Coatings;
- Correct use of tools depending on the application;
- Major causes of error;
- Reconditioning of tools and possible problems.

When talking about tools, we consider our whole production range, including:

- Hobs
- Shaping cutters
- Power skiving/Scudding® tools

- Shaving cutters
- Deburring tools
- Chamfering tools
- Roller tools
- Master gears and gauges

Many participants have underlined how the information received was extremely fruitful for their daily working activities. It is hardly surprising that a deeper knowledge of the production process can frequently minimize the risk of errors and bring to the designing of better solutions.

Participants have especially appreciated our approach to customer relationships that also includes an active support to our business partners through customized training and consultancies. As a matter of fact, only manufactures of gear cutting tools are fully aware of the technical specifications and potential of the products. Therefore, our support is essential to allow customers to take full advantage of their purchased gear cutting tools.

# Technical seminars for customers

Since 2019 Star SU Europe has been delivering technical seminars to all companies looking for a training support for their employees who work with the designing, production, and quality control of cylindrical gears, as well as with the purchase of the right gear cutting tools.

This training project stems from both the long-standing experience as gear tool manufacturers and from the synergies developed over the years with our customers and suppliers, thus integrating designing skills with application-specific know-how.

All seminars take place at the Star SU Europe's plant in Bentivoglio (Bologna, Italy) from 9:00 a.m. to 6:00 p.m. and are rounded off by a visit to our manufacturing site. At the end of the day, participants will receive a certificate of attendance.







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