

NEWS

ISSUE #
02
2020

SF-HP WORLD PREMIERE

O TEC launches innovative stream finishing machine for large and heavy components

INNOVATION AT O TEC

From an idea to a prototype

ADDITIVE MANUFACTURING

Processing 3D printed parts effectively without chemicals



EDITORIAL

Dear Reader,

Who could have predicted at the beginning of 2020 how this year would turn out and that the coronavirus pandemic would present us all with such unprecedented challenges in our personal lives and in the public and economic sphere? The effects are being felt not just in Germany, but all over the world. I would like to encourage you to look ahead. As a company, we are focusing on what is to come “after” the pandemic and are working on new machine designs and embracing this opportunity to increase digitalisation in the way we work.

For us, the biggest challenge has been, and still is, finding a way to replace cancelled exhibitions and customer visits at short notice. We devoted a lot of determination and energy into getting OTEC's Online-Workshops up and running overnight. Participants benefit from expert knowledge and from tips and tricks about mass finishing that can be put into immediate use. The feedback has been overwhelming and shown us that we are on the right track.

You can now take part virtually in workpiece processing at our Finishing Center to see how we handle your workpiece using our

machines and processes. Both of these services will continue to be on offer in our portfolio after the coronavirus pandemic.

I am also seeing positive developments in how we interact with one another on a daily basis: it is the small gestures that really count. Care and consideration for our families, colleagues and employees have become, quite literally, vital. That is why most of OTEC's staff are working from home or in alternating shifts to ensure that all departments can continue to be on hand to support you. For the safety of our employees, we have fixed 3D-printed mechanisms on our doors so they can be elbowed open. It goes without saying that we also have our own OTEC face masks for visitors and employees. Our cleaning team is also working overtime to disinfect critical stations more frequently.

The crisis has brought people together, despite social distancing, and has shown that mutual dependability is crucial in any relationship. We are here to support you and we will get through this crisis together! Please do not stop smiling behind your mask and, most

SF-HP WORLD PREMIERE





importantly, stay safe. We hope you enjoy reading this latest edition of the OTEC customer magazine.

Helmut Gegenheimer, Managing Director

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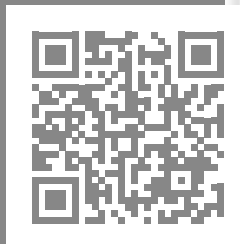
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<https://www.youtube.com/user/OtecGmbH>

HOW OTEC CREATES INNOVATIONS

AN IDEA IS BORN...

The second edition of our 2019 OTEC customer magazine featured a report on innovation management at OTEC. The central idea is having a standardised system that allows employees to present Predevelopment with their ideas for new or further developments of existing machine designs. “This innovation management system has been very well received,” says Daniel Stelzer, Head of Predevelopment. He is proud of this, and with good reason: one particular innovative idea from an employee has now entered series development in the design department. Market launch is planned in the coming months.

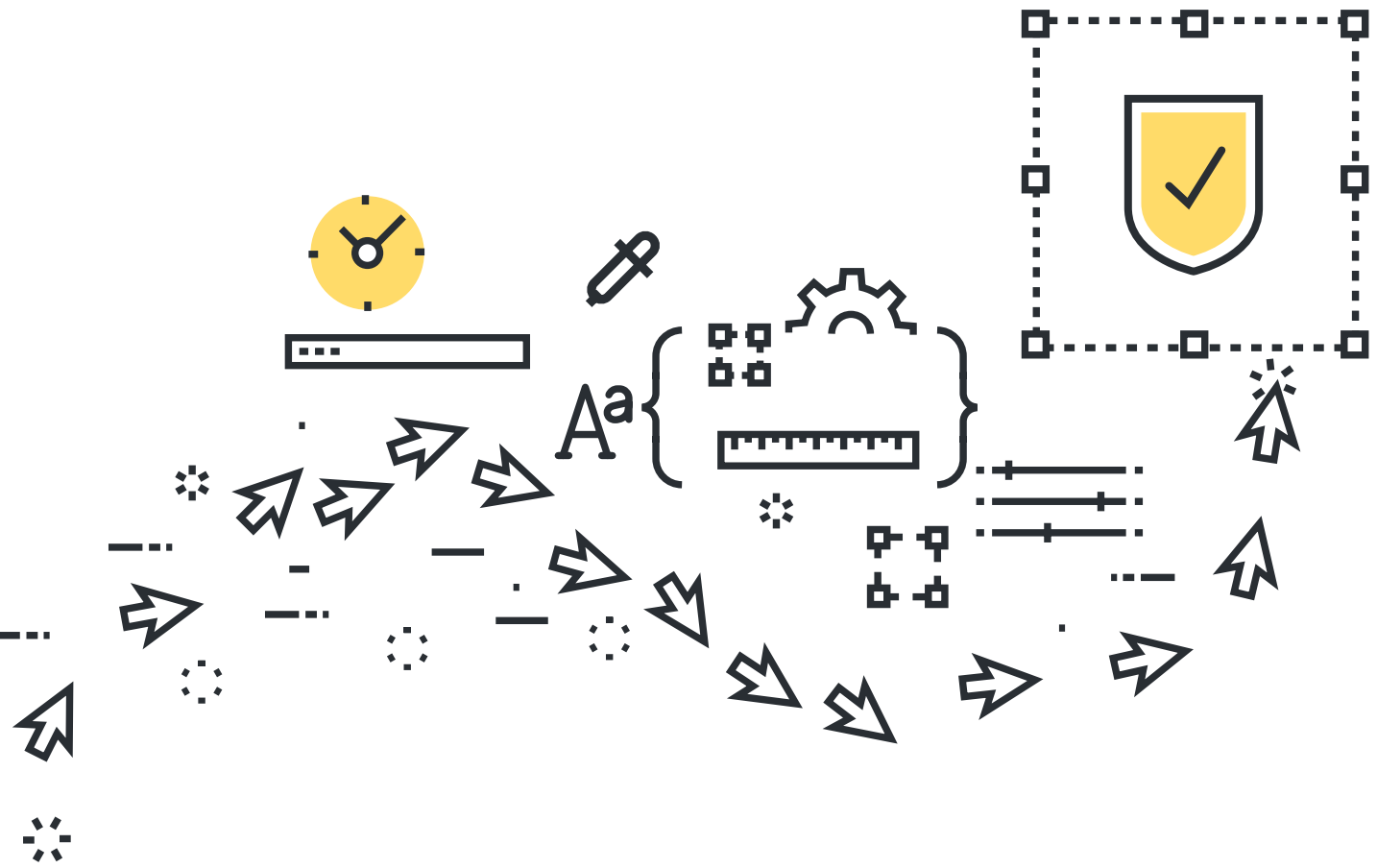
HOW IT ALL BEGAN...

The idea was first floated by Luca Wölk. He is a third-year Trainee Chemical Technician in the chemistry lab part of in-house process development. This is where OTEC processes sample workpieces using its machines, with no obligation on the part of the customer, so that the team can recommend the right machine and process suited to the customer’s finishing objective.

“Our Finishing Center often receives enquiries from smaller customers, such as jewellery workshops, which just do not have the space or the financial resources for a large EPAG Flex machine. However, they still want to be able to put the finishing touches to their jewellery pieces quickly, efficiently and consistently with the help of a machine. We were unfortunately unable to offer these customers a suitable solution – until now. The idea for an independent machine design was born and we could see it had serious potential. Here at OTEC, we engage with one another openly and on equal terms, and that sets us apart. Everyone is asked for their opinion and everyone is welcome to bring their ideas to the table.”

Luca Wölk
Trainee Chemical Technician





FROM AN IDEA TO A PROTOTYPE

“Predevelopment put the idea through its paces and investigated its market potential before deciding to pursue and develop it. Torben Esch from Predevelopment then took up the design and construction of the prototype as the topic for his bachelor’s thesis,” explains Stelzer.

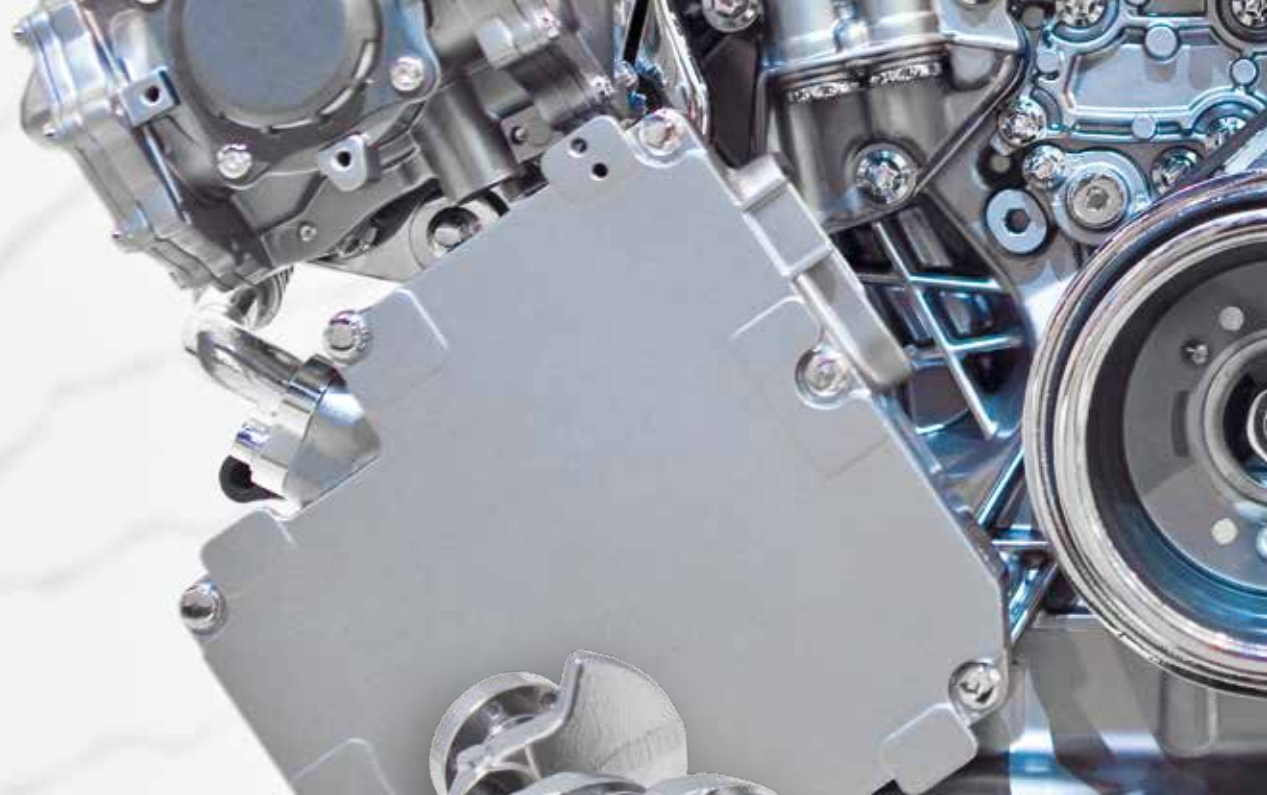
“I see it as a mark of confidence and appreciation that I have been given the opportunity to use a colleague’s idea as the topic for my final-year thesis so that I can develop it and design the machine. The aim was to create a concept and to have built a functioning prototype by the end. The fact that I could collaborate closely with the specialist departments was a huge help. I worked particularly closely with Luca and the chemistry lab, speaking to them on a

daily basis. That meant we could develop the machine with the customers’ requirements in mind right from the beginning. I also received help and advice in building the prototype from external partners such as 3D Profi GmbH. This meant I could make changes at short notice, use integrated structures and design the machine exactly according to the specifications. I would like to thank my supervisor Florian Reinle, Daniel Stelzer, the entire Predevelopment team, Harald Dietrich, Head of Production, and of course, Luca and the chemistry lab team.”

A more detailed presentation of the project will feature in the next customer magazine in spring 2021.



Torben Esch
Research Student



Crankshaft after OTEC finishing



INTERVIEW

TARGETED SURFACE PROCESSING HAS MEASURABLE BENEFITS

No doubt you have seen in the press that the EU plans to introduce automotive industry fines this year. Manufacturers will have to pay Brussels 95 Euro for every newly licensed combustion engine vehicle that exceeds the CO₂ threshold of 95 g/km. According to the Council on Clean Transportation, average emissions in 2018 were 121 g/km.

Florian Reinle, a Predevelopment Engineer at mechanical engineering company OTEC Präzisionsfinish, highlights how vehicle manufacturers can optimise their production processes and reduce friction at the same time.

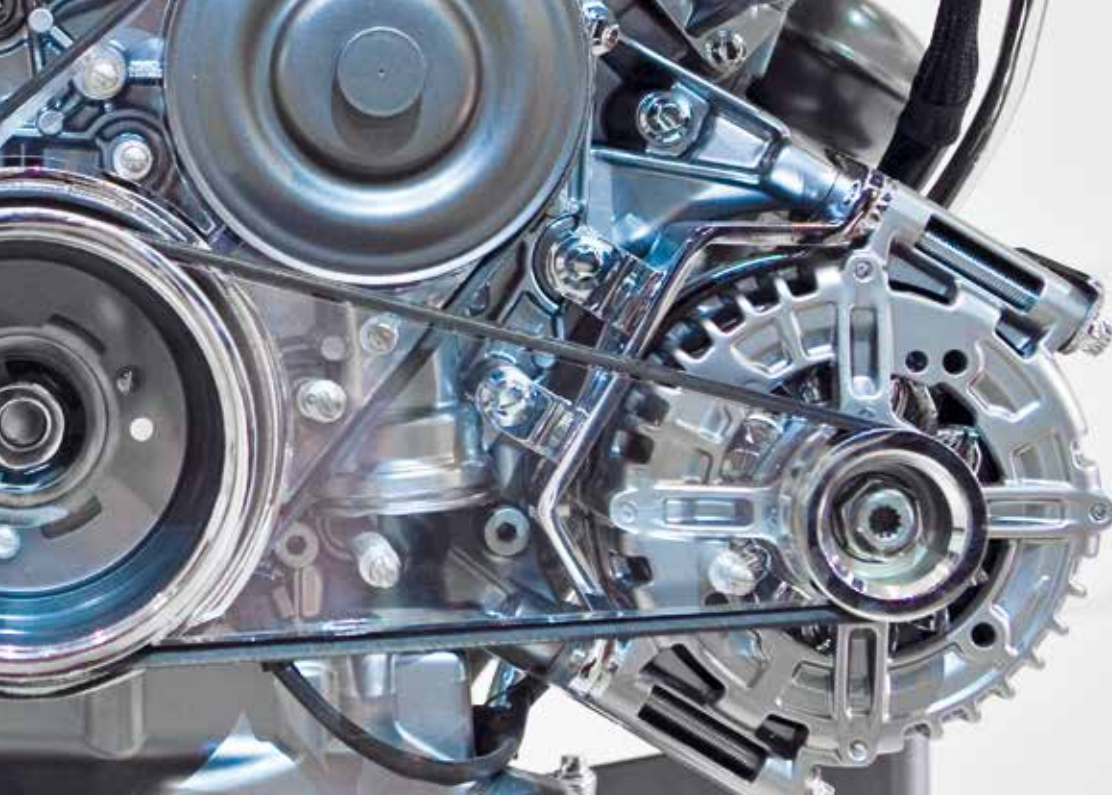
Florian, your work at OTEC is focused on friction, so you understand the pressure on the automotive industry. What do you recommend?

“We know from experience as well as talking to customers that targeted, application-optimised smoothing of friction contact surfaces makes a big difference in terms of efficiency. Sliding friction components like cam pieces, piston rings, crankshafts and gears can be mechanically smoothed with a high degree of precision. And smoothing has the added benefit of deburring, so we are actually talking about an all-round improvement to the component.”

It seems like a complex subject. Can you explain what you mean by targeted surface smoothing?

“Sure! It means levelling the surface and removing roughness peaks and machining grooves to produce an isotropic surface, and an agreed roughness based on the customer’s requirements.

Our process actually employs high friction energy to prepare components for use in a way that reduces both surface friction and wear. The process produces a shear layer by changing the surface structure and creating



compressive residual stress, which is highly effective in conditioning the component for use.

Taking that thought a step further, precision finishing reduces friction in the drivetrain, which means lower fuel consumption – i.e. more efficient use of drive power – and lower CO₂ emissions.”

That sounds very promising – can you talk more specifically about the other advantages and explain how the process enhances the component generally?

“The mechanical processing per se delivers process reliability and repeatability in minimal time, so it increases cost effectiveness. But it also improves product quality – you can tell immediately just by looking at the component. If we then add deburring or targeted edge rounding to the equation, there are other tangible benefits because it obviously improves assembly handling in terms of pressing in parts or inserting delicate components like gaskets. It quite literally improves slip.

Parts that are subject to heavy friction and wear are often coated. Optimising the surface beforehand improves adhesion and makes coatings more stable.

Components can even be smoothed after coating.

The improvement in NVH (Noise Vibration Harshness) behaviour is a particular bonus because it reduces audible or perceptible vibrations.

And smoothing the surface has a synergistic effect that improves NVH behaviour above and beyond the component itself. For instance, it means you can use low-viscosity lubricants and boost the efficiency of the whole system.”

The press are saying that electromobility is the ultimate solution if vehicle manufacturers want to limit or avoid fines.

“Yes. Policies are promoting an ongoing increase in electric vehicles, and that affects the various vehicle classes to a different extent. Most reports concern the increase in electric drive production.

But production alone is not enough – the vehicles also have to sell. And that is where competition and consumers come into play. End customers considering an electric car look carefully at the cost-benefit ratio, particularly in terms of range, purchase price and operating costs.”



Florian Reinle
Predevelopment Engineer

AUTOMOTIVE

Do friction and NVH play a role in e-mobility as well?

“Yes. Surface processing for electric drive components has clear advantages that are highly relevant to end customers – worth their weight in gold, you might say. Just as for the combustion engine, component surface optimisation in electric drives boosts efficiency and enhances component properties generally. The process is cost-effective by default, but even more so if you use it in a targeted way to focus on the components that cause the most friction. Ultimately it means you can get the same range from a smaller, cheaper battery or extend the range of a battery of equal size.

Noise emissions, i.e. NVH optimisation, is another key topic in electric drive development because you can hear noises that the combustion engine used to drown out.”

Why should automotive manufacturers consider using OTEC process technology in particular? How does your process have the edge over others?

“Our existing automotive customers are benefiting not only from the component enhancements I have already mentioned but also from process advantages. OTEC’s special stream finishing process is acid-free, which is good news for people and the environment. It is also cheaper than other finishing processes. And with average processing times of 90 seconds, it is the fastest mass finishing process on the market.

The big difference between OTEC Präzisionsfinish machines and others is the high processing forces and high proportion of frictional energy. In stream finishing, the workpieces are clamped in a holder and lowered into a rotating container filled with an abrasive or polishing medium.

The workpiece rotates and is processed as the medium circulates around it. Stream finishing can remove material faster and more precisely than any other mass finishing process. Our SF range is specially designed for application requirements that existing processes were unable to meet. Repeatability and process time are critical factors in the automotive industry.

The high forces built into our machines can also process thin geometries very effectively using fine grinding and polishing media. And with easily adjustable cycle times and automatic loading options, they are perfect for integration in production lines.”

Thanks Florian!



IT RUNS LIKE CLOCKWORK

SF-SERIES AUTOMATION WITH ROBOT LOADING SYSTEM (RLS)

When processing large volumes of workpieces, short loading and set-up times make your operations far more efficient. That is where our automatic robot loading system comes in. SF Automation Series machines can be fitted with optional pulse finishing and work well, for example, in cyclic production lines. Depending on your requirements, the machines can either be set up for automatic loading or fitted with it as an integrated option. The machine design is modular and therefore easy to adjust to cycle time. The SF Automation can thus be easily integrated as a key element in any production line.





EMPLOYEES INTRODUCE THEMSELVES

“The coronavirus has made its presence known here at OTECE Präzisionsfinish. But we have not let that throw us off course in our recruitment and strategic plans,” says Helmut Gegenheimer. “We are delighted when new employees come aboard and help strengthen our family company with their skills, character and curiosity as we sail through rough waters.”

Welcome to the OTECE family!

Simon Stamm joined OTECE Präzisionsfinish on 1st. of April 2020, as an Area Manager for Sales and Marketing. “I am pleased to have been given a new challenge, even though there are better circumstances than a pandemic for a new employee to join a team! But

we have seen that this crisis, which continues to turn our daily lives upside down, has also opened up new possibilities for digitalisation and innovation for us as a mechanical engineering company to enhance how we support our customers. That support is albeit not as personal as face-to-face meetings, but the digital world makes it fast and straightforward.”

SIMON STAMM, 31

Hobbies?

DIY to clear my head, cooking and jogging for body and mind, and volunteering for the fire brigade

Favourite food?

A nice steak

Most recent holiday destination?

I went skiing in the Alps in winter and stayed in a finca in Croatia over the summer

What did you want to be when you were young?

A car designer

What are the benefits of working for a family company like OTECE?

The special environment at OTECE and the people that are its lifeblood, and the chance for everybody to make a difference without having to jump through hoops

What values and attitudes are important to you?

Dedication and loyalty to the company, and collegiality and honesty towards colleagues; creativity and enthusiasm for your work, and ambition and determination for yourself

What has been your biggest challenge since joining in April?

Not putting on weight because of the great food :)



OBTAIN THE PERFECT FINISH ON ADDITIVELY MANUFACTURED WORKPIECES, WITH DISC FINISHING!

Example of a 3D printed workpiece (SLS) made by SolidPro, before (left) and after (right) processing



According to DIN 8580, 3D printing is one of the primary forming manufacturing processes, in which a solid body with a geometrically defined shape is produced from a formless material. The process employs a wide range of materials such as metals, plastics and ceramics. Discovered over 30 years ago, additive manufacturing processes are now sufficiently mature as to be gaining a gradual foothold in industrial production. Whether for prototypes or series production, additive manufacturing is used across all industries for visible and functional components as well as customised design products. Jewellery parts, dental implants, earmoulds and engine blades are just a few examples.

The greater the possibilities of this generative process, the higher the workpiece specifications become. Series quality is the name of the game, which means that surface quality, repeatability and process reliability are under the post-processing spotlight.

Additively manufactured parts present specific post-processing challenges

All 3D printing processes selectively apply the layers of a component, i.e., it is composed of successive layers.

This principle makes component forming both flexible and customised. Being layered, 3D printed parts have a distinctive surface structure characterised by striations, pores, fissures and cavities.

The classic solutions for improving surface quality and reducing the staircase effect

The conventional solutions are manual post-processing, solvent vaporising or mass finishing, for example vibratory tumbling.

The downside of the first option is that the human factor in manual smoothing and polishing is not cost-effective in terms of repeatability and process times.

Chemical smoothing processes require time-consuming and therefore costly work to prepare, replace and dispose of solvents. The acquisition costs are also higher than for other post-processing techniques, which essentially defeats the object of efficient volume production.

Vibratory finishing, on the other hand, involves no chemicals. But process times can be very long and hence often uneconomical.

So is there an alternative? Can you obtain series quality on 3D printed parts made from a range of materials? You certainly can!

OTEC disc finishing machines produce homogenous surfaces very quickly, without chemicals

OTEC disc finishing machines homogenise spongy, porous surfaces much faster by smoothing and polishing them. This comes down to our machines' mechanical operating principle: workpieces up to fist size (depending on machine configuration) are placed in the blue process container as bulk or piece goods along with grinding and polishing media suitable for the workpiece geometry and material. The container floor is a disc with a rotary bearing. When the disc turns at the bottom of the fixed container, the contents are set in motion in a toroidal flow. Centrifuging the workpieces and abrasive makes this a highly intensive and purely mechanical process.

Often imitated, never matched: the OTEC CF Series is renowned for application flexibility, repeatability and process reliability

Consistent parameters guaranteed time after time: the machine's central control unit lets you store and monitor workpiece-specific process parameters that you can run at the press of a button. You can also adjust the water/compound concentration via the touch panel, ensuring process reliability.

Sophisticated, smart technology: the container features a disc floor, a ridged cylinder and a replaceable wearing ring. This minimises spare parts costs as there is no need to replace the whole container.

OTEC's patented zero gap system prevents abrasives or very thin, intricate parts from getting lodged in the gap during processing. It also provides thorough drainage so that no residual water is left in the container when the process is complete.

The container for our CF Machines is optimised for better circulation, resulting in shorter process times and smoother surfaces.

Time is money!

Compared with vibratory finishing, OTEC disc finishing machines have a much higher mechanical abrasion level. For manufacturers of 3D printed parts, that means shorter process times – by a factor of 5 to 10.

And unlike chemical smoothing, our CF machines use no harsh chemicals such as solvents. They are safe to handle, simplify the workflow and save you time. What is more, they are cheaper to buy and operate. In short, they cut series production unit costs.

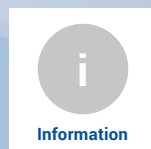
Our machines reduce manual rework to the absolute minimum if not to zero. That largely depends on the application in question and on your finishing requirements. Generally speaking, repeatable, reliable mechanical processing with disc finishing cuts the cost of manual work by 80%. Only the final polish – for example with jewellery – needs to be done by hand.

CF processing example: SLS manufactured metal workpieces

In finishing tests with metal workpieces printed using SLS, the OTEC CF disc finishing machine achieved an average of 1-2 hours per batch.

CF processing example: 3D printed plastic earmoulds

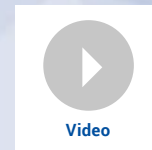
Depending on the number of parts and their initial state, you can vary abrasives and runtimes. The average time for each step in the process is 1-2 hours. And depending on the machine you can also process larger batches simultaneously. From small runs to volume production, the OTEC CF-Series is the perfect choice. Read more:



The UNISEPA sieving machine: mobile and flexible sieve separation

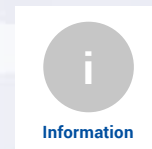
The new OTEC UNISEPA is a universal solution for separating grinding bodies from a variety of workpieces. With settings options for the flow regulator, vibration frequency and vibration amplitude, the UNISEPA can handle just about any separation task.

Video of CF 1x18 with UNISEPA



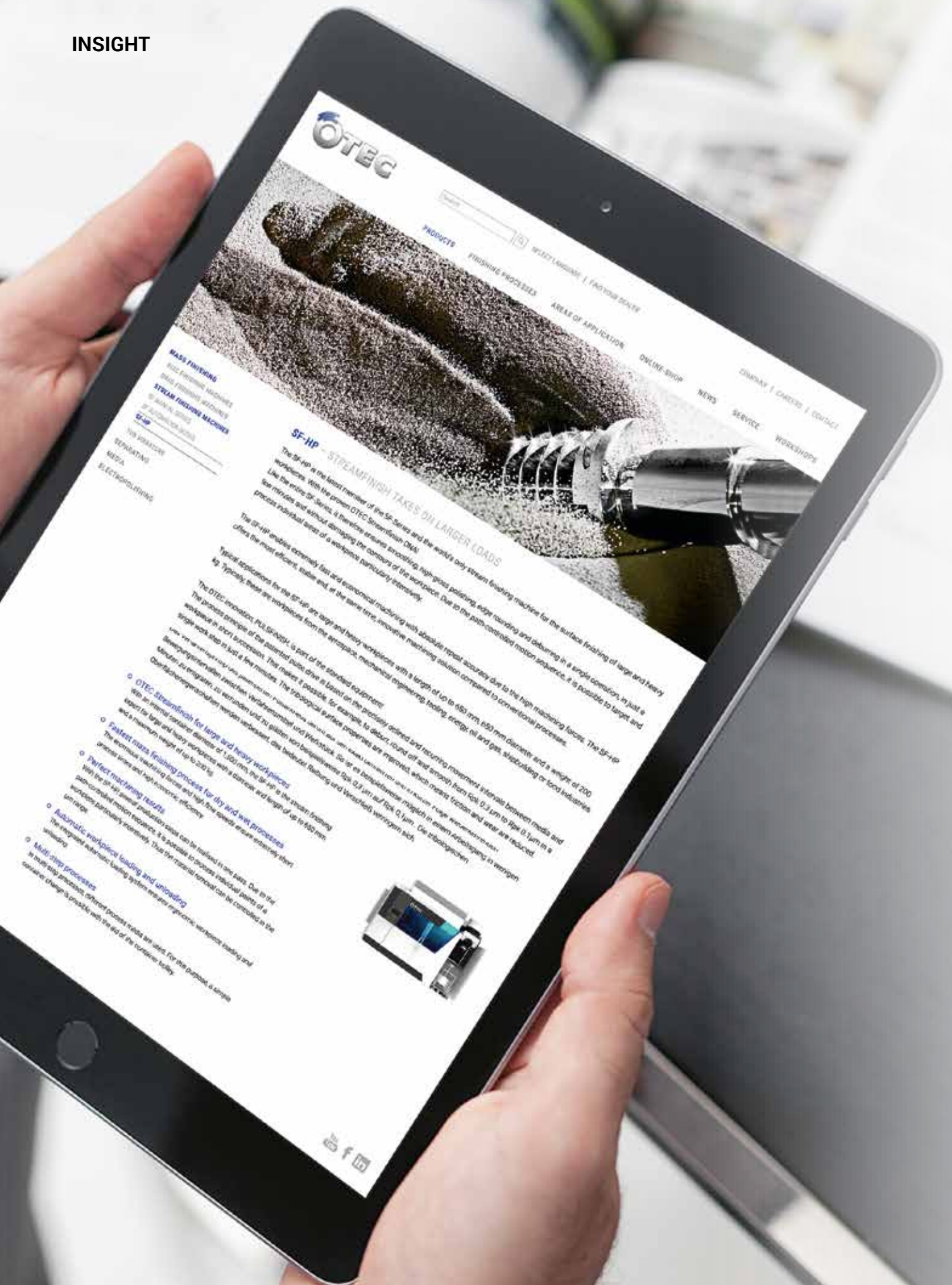
Every workpiece is different. Put us to the test!

Send us your samples and let our experts at the OTEC Finishing Center specify your custom process:



The OTEC CF-Series





- PRODUCTS
- FINISHING PROCESSES
- WHEEL LANGUAGE | FACTORY DEALER
- AREA OF APPLICATION
- ONLINE-SHOP
- COMPANY | CAREERS | CONTACT
- NEWS
- SERVICE
- WORKSHOPS

- MASS FINISHING
- ROLL FINISHING MACHINES
- DRUM FINISHING MACHINES
- STREAM FINISHING MACHINES
- SPARK BRUSH
- SPARK BRUSH MACHINES
- SPARK

- NEW SOLUTIONS
- REGISTRATION
- MEDIA
- ELECTROFINISHING

SF-HP - STREAMFINISH TAKES ON LARGER LOADS

The SF-HP is the latest member of the SF-Series and the world's only stream finishing machine for the surface finishing of large and heavy workpieces. With the proven OTEC StreamFinish-DNA. Like the entire SF-Series, it therefore ensures astounding high-gloss polishing, edge rounding and deburring in a single operation in just a few minutes and without damaging the contours of the workpiece. Due to the path-controlled motion sequence, it is possible to target and process individual areas of a workpiece particularly intensively.

The SF-HP enables extremely fast and economical machining with absolute repeat accuracy due to the high machining forces. The SF-HP offers the most efficient, stable and, at the same time, innovative machining solution compared to conventional processes.

Typical applications for the SF-HP are large and heavy workpieces with a length of up to 650 mm, 650 mm diameter and a weight of 200 kg. Typically, these are workpieces from the aerospace, mechanical engineering, tooling, energy, oil and gas, shipbuilding or food industries.

The OTEC innovation, PULSBRUSH, is part of the standard equipment. The process principle of the patented pulse drive is based on the precisely defined and recurring movement intervals between media and workpiece in short succession. This makes it possible, for example, to deburr, round off and smooth from 600 to 0.3 µm to Rn 0.1 µm in a single work step in just a few minutes. The tribological surface properties are improved, which means friction and wear are reduced. Bearings and rollers run smoother, the surface is more resistant to corrosion and the glazing von Beschleunigung bis 0.3 µm auf Rn 0.1 µm. Die tribologischen Oberflächenverhältnisse werden verbessert, die Reibung und Verschleiß verringert sich.

- **OTEC StreamFinish for large and heavy workpieces**
Up to an overall outside diameter of 1,000 mm, the SF-HP is the stream finishing machine for large and heavy workpieces with a diameter and length of up to 650 mm and a maximum weight of up to 200 kg.
- **Fastest mass finishing process for dry and wet processes**
The extremely reducing forces and high feed speeds ensure extremely efficient process times and high economic efficiency.
- **Perfect machining results**
With the SF-HP several production steps can be realized in one pass. Due to the path-controlled motion sequence, it is possible to process individual parts of a workpiece particularly intensively. Thus the material removal can be controlled in the workpiece.
- **Automatic workpiece loading and unloading**
The integrated automatic loading system enables ergonomic workpiece loading and unloading.
- **Multi-step processes**
In this step automatic different process runs are used. For this purpose a simple parameter change is possible with the aid of its computer table.



SF-HP MASS FINISHING WORLD PREMIERE

HEAVY AND LARGE COMPONENTS BENEFIT FROM NEW STREAM FINISHING MACHINE



The newly developed SF-HP allows customers to carry out surface processing for a wide variety of products in one machine. It is especially suited to polishing, deburring and edge rounding of larger components. The workpieces are fed in by an integrated loading system. Because of its compact design, you can easily integrate the machine into your production, and can expect repeatability thanks to its sophisticated stream finishing technology. Our unique, patented pulse finishing process that guarantees optimum processing results is integrated in the new SF-HP.

Efficient processing of heavy and large components is now a reality!

The advantages of the SF-HP at a glance

- Short processing times for large components thanks to pulse finishing technology
- Faster processing of components with a diameter of up to 650 mm and weighing up to 200 kg
- Compared with trough vibrators (quicker by approx. 6 h, e.g., for turbine discs)
- Positive tribological effects on the workpiece surface, such as greater resistance to wear and tear and less friction as a result of highly dynamic processing
- Sharp edges of workpieces such as turbine discs can be rounded in the SF-HP

without being chamfered beforehand, saving an additional production step

- Superb surface quality even for the smallest of workpieces
- The SF-HP covers a wide range of processes depending on the requirements of the workpiece, including smoothing, high-gloss polishing, edge rounding and deburring

For more information on the new SF-HP, go to

<https://www.otec.de/en/products/mass-finishing/stream-finishing-machines/sf-hp/>



Information

SINCE 1996

TRADITION & INNOVATION

Neuenbürg-based grinding and polishing company Klaus Müller has especially close ties with OTEC Präzisionsfinish. We began discussions in 1996, with the added benefit that our businesses were only a few miles apart. OTEC – which at the time was what we would now call a startup – was in search of the right compounds for its process development. Klaus Müller had exactly what we were looking for – and still does today. He and OTEC Managing Director Helmut Gegenheimer struck up a partnership that has flourished ever since.

In an interview with Klaus' son, Boris Müller, we discover the key to this successful long-term relationship.

Boris, how long have you been using OTEC machines? And what is the human story behind your relationship with the company?

“OTEC was looking for a new type of compound. The conventional surface processing technology at the time was vibratory finishing using bowls or drums, but OTEC was busy revolutionising that with its disc finishing machine. My father had already made a name for himself in compound development, so that is how the two entrepreneurs met – they were both innovators. We added the first OTEC machine to our surface processing portfolio in 1998. Since then we have added another 11.”

In your experience, are there surface refinements that only OTEC machines can handle?

Müller winks: “OTEC machines can do everything!

One big reason why we love the technology is because it can handle ultra-small, micro or delicate parts, and complex geometries like housing components. It is unique in that respect. For those orders, only an OTEC finish hits the mark.”





What would you say are the advantages of OTEC machines and processes?

“Flexibility, without a doubt! In terms of day-to-day business, we benefit from short set-up times between jobs, really fast processing and low procurement and maintenance costs. The icing on the cake is that we are located so close to each other, which means we get the direct benefit of expert knowledge and can share valuable expertise.”

As a customer, what do you value most about the relationship?

“Basically, after working together for 20 years we just know each other really well. Everyone is always professional, but friendly, too. And that means we trust each other, which is why the relationship has flourished – so far for two generations.”

Boris, many thanks for being so open with us. We wish you and your business every success!

**Klaus Müller GmbH,
founded in 1990**

You can count on us, even during the coronavirus crisis.

For more information plus videos, visit www.klausmueller.net





IMPRESSUM

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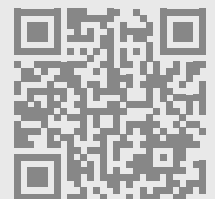
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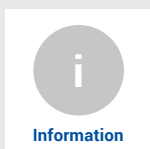
OTEC ONLINE WORKSHOPS

WE ARE HERE TO SUPPORT YOU WITH OUR MASS FINISHING EXPERTISE!

Since April of this year, we have been offering exclusive online mass finishing workshops. They provide tips and tricks for practical use – free of charge. The feedback from the some 1,500 participants so far has shown that these webinars are an excellent opportunity for our customers to benefit from our expert knowledge in their daily work.

**Go to our website to search and register
for upcoming workshops:**

<https://www.otec.de/en/workshops/online-workshops/>



Want more updates from OTEC Präzisionsfinish?
Then follow us on social media!

