# NEWS

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## TEC CONFINES FRICTION TO THE RACETRACK

Innovative processing specially optimised for the automotive industry

## CF SERIES IN USE

Deburring of shock absorbers at KYB

# EDITORIAL

## *Dear Reader,*

We are pleased to present the latest edition of OTEC News, with information about all the latest developments at OTEC. 2017 was a year of full order books, and this trend has continued into the early part of 2018 to keep us busy. We know that this success is only possible thanks to our dedicated employees. That is why we have welcomed 11 new members of staff to OTEC since January.

As customer requirements become more demanding in a dynamic market, machinery manufacturers are faced with difficult challenges. To respond to these challenges and the complexity of the market, we are putting new innovations into action quickly and forming staff teams. These measures help us keep our customers happy and allow us to react to market changes quickly and flexibly.

The automotive and motorsport industries place particularly high demands on the components used. By making smart modifications to our machines and processes, we aim to constantly improve the surfaces of drive train components. Renowned Formula 1 teams rely on OTEC when it comes to processing the surfaces of their drive parts and have been impressed by the results. The processing has an enormous effect on engine performance. Find out more in our technical report on page 10 about reducing friction between components.

The feedback we receive from our customers spurs us on to become even better. That is why we will continue to do everything in future to keep improving our solutions for you.

We hope you enjoy reading this newsletter.

Soran Jota

Soran Jota
Managing Director

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IN POLE-POSITION

# OTEC CONFINES FRICTION TO THE RACETRACK

**While engineers in the automotive industry are always looking for ways to optimise efficiency, smooth running and emission management, the focus in motorsport is on pushing performance to its limits.**

Innovative technologies: Lightweight SLM valve

As an international technology leader in mass finishing, OTEC designs and builds systems that reduce friction between components, benefiting both the premium car segment and motorsport. The heat, stresses and material abrasion caused by friction are detrimental to the precision and service life of all components. Lower friction means less wear, smoother power delivery and better energy consumption. The aim is always to minimise the influence of friction on the system as far as possible.

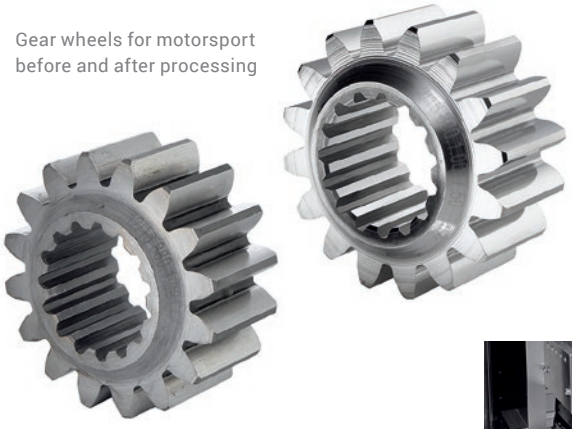
OTEC machines are the answer, with innovative processing specially optimised for every application. During surface processing of camshafts and gears, for example, all sharp tips are rounded, preventing chip formation.

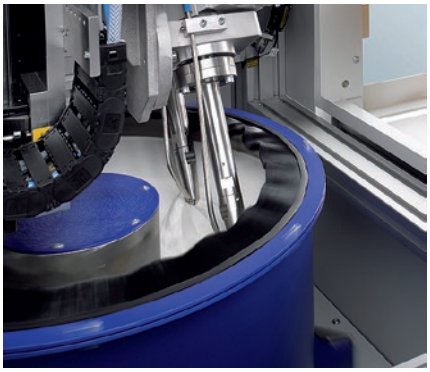
In general, OTEC finishing enables the so-called third body to be formed more quickly between two surfaces in friction. This is the boundary layer where the surfaces, which are separated by a thin oil film, transfer their kinetic energy to each other. This flexing action makes the crystalline nanostructure of the layer extremely fine with a pasty viscosity, reducing friction.

This eliminates the need for lengthy running-in of engines and gearboxes, which reduces oil contamination and extends oil change intervals by up to 100%. An additional benefit is the 10% reduction in heat generated and up to 50% less noise emissions compared to conventionally ground parts.

Another advantage is the decrease in micropitting with gear wheels where the lubricating film breaks through at localised points causing mixed friction and excess pressure. This wear causes flattening at the contact point. The most important individual parameter

Gear wheels for motorsport before and after processing





Complex shapes: A lightweight shift drum of an electric car

is the surface roughness. Values below 0.2 $R_a$, which OTEC finishing typically achieves, can significantly reduce micropitting.

With weight optimisation being a critical factor not only in motorsport or the premium car segment, new technologies such as electric mobility also present developers with major challenges. New shapes and materials sometimes require completely new manufacturing processes, that in turn need innovative solutions for surface finishing.

Selective Laser Melting (SLM), for example, is a relatively new generative manufacturing process. The workpiece is built up with metal powder layer by layer using a laser. Smaller components such as engine valves can therefore be constructed with an internal honeycomb structure, saving significant weight without impairing functionality. However, the surface roughness that can be achieved by this manufacturing process clearly exceeds the expectations of modern production processes.

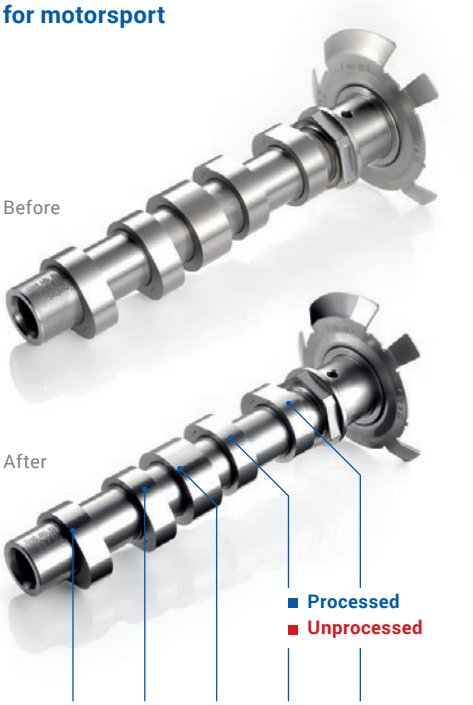
OTEC's machine and process technology solves this problem. Depending on the application, multi-stage processing uses various abrasive grinding media that are already proven for preparing the cutting edge of tools, deburring, smoothing and polishing tools, removing droplets on the chip groove, and so on.

OTEC has developed the PULSFINISH process especially for integration into mass production lines. The clamped workpiece is immersed in the media flow of the rotating container and accelerated to over 2,000 rpm in a very short time. Within 0.5 seconds, the workpiece in the media is increased to maximum tangential acceleration and deceleration back to zero, producing relative speeds of up to 30 m/s and accelerations of up to 40 G.

The benefit is the extremely short process times: our mass finishing process is probably the fastest – even for complex parts such as worm shafts, gear wheels or camshafts. These can be deburred, rounded, smoothed and polished in seconds, making it easy to integrate the machine into any production cycle.

Mass finishing with the PULSFINISH process not only removes grinding marks and reduces the roughness parameters to values significantly below 0.1 µm, but also creates microcavities. These collect the lubricating oil, which is not displaced on contact as it is with conventional grinding grooves. Extensive tests have shown that uniform, smooth surfaces with microcavities and low $R_{pk}$ values generate the least wear and reduce friction losses. ■

## Improving the frictional characteristics of camshafts for motorsport




| µm | MP1 | MP2 | MP3 | MP4 | MP5 |
|---|---|---|---|---|---|
| Ra | 0.217 | 0.232 | 0.176 | 0.22 | 0.224 |
| Ra | 0.04 | 0.04 | 0.04 | 0.05 | 0.05 |
| Rz | 1.27 | 1.67 | 1.11 | 1.66 | 1.64 |
| Rz | 0.425 | 0.419 | 0.353 | 0.365 | 0.429 |
| Rpk | 0.166 | 0.175 | 0.157 | 0.175 | 0.267 |
| Rpk | 0.069 | 0.077 | 0.047 | 0.054 | 0.04 |
| Rk | 0.639 | 0.659 | 0.573 | 0.647 | 0.671 |
| Rk | 0.135 | 0.129 | 0.134 | 0.135 | 0.173 |

# THE OTEC FINISHING CENTER


The OTEC team in the Finishing Center

The team at the Finishing Center focus mainly on determining the ideal process parameters. Every time a customer sample arrives, the team develop a processing sequence customised to the workpiece and the requirements. Customer samples come from all kinds of sectors, such as the automotive industry, machine tools, medicine or jewellery. As a result, the requirements can vary greatly depending on the workpiece. From deburring and rounding to smoothing and high-gloss polishing, our disc finishing, drag finishing and stream finishing machines can fulfil a range of processing tasks. With expertise and many years of experience, our team are able to find the right individual solution for even complex tasks.

**A perfect surface requires perfect interaction between all process parameters. This not only includes the right choice of abrasive, but also the correct process time, speed and workpiece alignment in the container. A whole range of parameters influence the processing result.**
**As every workpiece is different, these must be adjusted individually to the workpiece and requirements.**

**This calls for expert knowledge, flexibility and many years of experience. Our staff at the Finishing Center offer precisely these skills.**

Using leading-edge measuring technology, the team measure and assess the processing results down to micrometre range. The results are recorded in a report together with all process parameters. The collected data can be used to take readings on workpiece abrasion, grinding pattern, surface thickening and other technical details. These provide important insights for the rest of the sequence, in order to put together the right grinding and polishing medium for each individual customer. This requires close cooperation with customers so that results can be compared to requirements. After all, the aim is a perfect surface that meets the customer's individual wishes and specifications.

The team at the Finishing Center not only process samples, but also develop new mass finishing technologies and processes. Together with the Development department, they test innovations and gain new insights to help develop OTEC machines and abrasives.

+ + + EDITION #01 OF OTEC NEWS WILL BE PUBLISHED IN JANUARY 2019 + + +

Sterneninsel
Kinder- und Jugendhospizdienst
Pforzheim und Enzkreis e.V.

**We report on Sterneninsel e.V. (English: "Star Island"), the outpatient hospice service for children and young people in the city of Pforzheim and 28 other communities in the Enz region of south-west Germany.**

*»WE WILL DO ALL THAT WE CAN NOT ONLY TO HELP YOU DIE PEACEFULLY, BUT ALSO TO LIVE UNTIL YOU DIE!«*

When we first found out about the hospice, we were amazed by the work of this team of 30 volunteers and were eager to help.

Sterneninsel provides help and support to families and relatives when a child or youngster is diagnosed with a severe incurable disease. Alongside supporting the affected child and parents, the charity can also help the entire family come to terms with the situation, such as by helping around the home. Sterneninsel also provides grief counselling after a loved one passes away.

This can happen immediately following a bereavement or several years after a person's death if relatives are struggling to overcome their loss.

The charity provides individual and group counselling throughout the year.

Sterneninsel was founded by a group of paediatric nurses who saw an increasing need in recent years for domestic psychosocial support for families of terminally ill children, in order to provide them with comfort. The name was inspired by an ill boy who believed that every person becomes a star when they died.

At the end of 2017, OTEC paid a visit to the hospice to hand over a donation in person and get to know the charity better. Director Angelika Miko gave us a warm welcome. She gave us a tour of the hospice and told us about Sterneninsel, its work and how it is inspired by Cicely Saunders' guiding principle: "We will do all that we can not only to help you die peacefully, but also to live until you die."

This sense of purpose became all the more clear when new pictures were added to the wall during our visit. Every picture had its own story. There were shared experiences, trips, fun and happy moments, as well as those that were more sad or poignant. But what we noticed more than anything was the number of happy, precious hours spent here together and with the families, along with the joy and dedication of the staff at Sterneninsel. We are happy to continue our support for this project. ■

**For more information about Sterneninsel, please visit https://sterneninsel.com (German only).**

OTEC SUPPORTS MOTORSPORT HALDER

# SUCCEEDING TOGETHER


**The Motorsport Halder race team oozes ambition, team spirit and a passion for motorsport. These factors are what convinced OTEC to lend a helping hand.**

From an early age, Mike and Michelle Halder were fascinated by motorsport. The pair began driving go-karts as children and worked their way up to the ADAC TCR Germany championship. Michelle Halder had previously spent several years driving in Formula 4, and made the switch to ADAC TCR Germany in the 2018 season after her brother Mike finished runner-up the previous year. Michelle experienced great success in her first season, becoming the first woman in the history of ADAC TCR Germany to achieve a podium position. The ADAC TCR Germany is a new touring car series that closes the gap between formula racing and rally. It is the perfect platform for talented youngsters like the Halders. The engines in the touring cars produce around 350 hp. For the drivers, this requires talent, hard concentration and the right feel for speed and precision. Motorsport is all about technology at the limit, perfection in the details and absolute reliability. For OTEC, these values are also central to surface processing. Components in the automotive and motorsport industries are subject to very high stresses, and must be optimised for excellent performance.

One of the most important elements here is the friction between the components, which can be fatal for the engine and gearbox. OTEC's mass finishing process helps reduce friction values and improve the overall component properties. Perfect surfaces on gear wheels, cam shafts and gear parts can lead to significantly improved performance, lower heat generation, and a longer service life for the individual components. In motorsport in particular, the technology used must be absolutely reliable. Mike Halder is fully aware of this. As a trained car mechatronics technician, he and his team are responsible for keeping the two cars in working order. The siblings spend virtually every spare minute preparing for the races together. This special kind of family cooperation was noticeable at the racetrack. OTEC was given a glimpse behind the scenes at the team's paddock. We look forward to more exciting events and wish Michelle and Mike Halder every success. ■


*»GET IN GEAR AND HIT THE ACCELERATOR!«*

**Current summer events:**

| | |
|---|---|
| 03. – 05.08. | Nürburgring |
| 17. – 19.08. | Zandvoort |
| 07. – 09.09. | Sachsenring |
| 21. – 23.09. | Hockenheimring |

# DEBURRING OF SHOCK ABSORBER DISCS

## One process combines numerous advantages

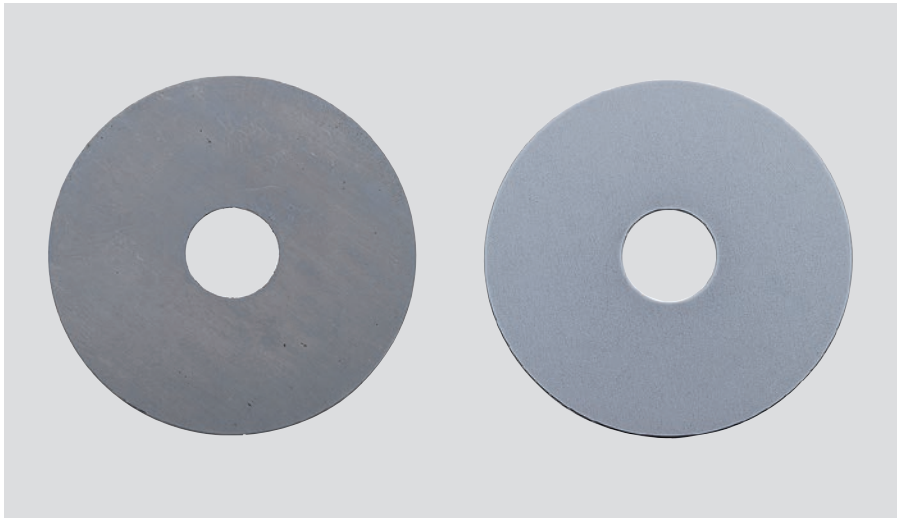
Stamped parts are used in a wide variety of applications in the automotive industry and are used, for example, as discs in shock absorbers. The main processing task is deburring and selective rounding of the edges. Due to the thickness of the components of less than 0.5 mm, some challenges arise during surface finishing. As the workpieces are often very thin, there is a risk that they get bent. This must be avoided during the finishing process. In addition, in conventional processes the process times are very long. The OTEC disc finishing machines of the series CF allow that sensitive shock absorber discs will be deburred and rounded quickly, absolutely reliably and process capable. The effect of the different centrifugal forces between workpieces and media results in very intensive finishing. This can be 20 times more effective than conventional techniques. Many years of experience have been incorporated into these machines, making them the perfect solution for deburring and rounding. And that is why KYB, one of the largest suppliers of shock absorbers to car manufacturers, relies on process technology and machines from OTEC! One million shock absorbers a week come off KYB's production lines. The company has factories all over the globe, including the world's largest shock absorber production plant, which is in Gifu, Japan. By using CF 50 disc finishing machines from OTEC, it was able to bring about major improvements in its production of shock absorber discs:

### Shorter process times

The disc finishing machines have considerably reduced the machining time. In the most extreme case, the process was cut from 30 hours to just 3.

### Increased productivity

More effective machining means that more batches can now be machined in one shift than ever before. On average, productivity has risen from 7 batches to 12.



### Top machining results

Using the OTEC process, the discs are deburred with precision. Quality inspections have revealed a considerable improvement. No burrs remain, whereas in the old process, poorly deburred parts often had to be rejected or re-machined.

### Less noise

Using the centrifugal disc finishers has enabled KYB to replace several machines. What's more, the OTEC machines generate less noise than conventional methods, making production a whole lot quieter.

### No mixing of parts

Simple and thorough emptying of containers prevents parts from being left behind and different batches from getting mixed up. OTEC offers spray nozzles for completely emptying containers after machining, which are

ideal for working with fine, lightweight workpieces such as shock absorber discs. This guarantees process reliability.

### Lower media consumption

Media consumption has been drastically reduced compared with the old methods. The company is achieving savings of roughly 1000 kg a month.

### Reduced energy costs

By using disc finishing machines, fewer machines are needed in total, and these consume less energy.

### Fewer repairs

The conventional machines had to be repaired every year, resulting in high costs. The OTEC disc finishing machines use only top-quality materials and components. This ensures trouble-free operation and a long service life.

### More efficient assembly

Precision deburring of workpieces has led to increased efficiency in automated part assembly. No burrs are left following the process in the CF machine. Consequently, automated assembly is better and faster without any interruptions due to error messages. Efficiency has increased from 68% to 72.5% and continues to rise. Less machine downtime means that volumes have increased from an average of 4,800 to 5,500 parts per shift.

### Personal customer service

Reliable, all-round service – during your purchase and beyond. Close contact with and support from OTEC specialists with many years of expertise. ■

**OTEC SALES PARTNER**
**FOR THE MIDDLE EAST AND NORTH AFRICA**

# SURTEK

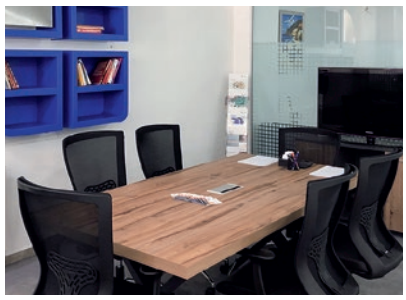

All the companies that sell SURTEK products are world leaders in their sectors. SURTEK offers high-quality machines as effective and cost-efficient solutions to all the problems and challenges of surface machining and cleaning.

The company is based in Istanbul, where its well trained, well qualified team of eleven do their work. SURTEK is further developing its skills with its qualified and experienced workforce, and is keeping pace with all the changes taking place in today's industry.

As well as enjoying success in the industry, SURTEK also boasts extensive expertise in the finishing of jewellery. That's why, in 2015, it became OTEC's exclusive dealer for the jewellery industry for the whole of the Middle East and North Africa. In these regions, too, SURTEK can now offer the best solution for perfect surfaces - with commitment, knowledge and support. Its own Finishing Centre in Turkey enables the company to carry out sample machining locally and to visit customers in person.

Despite the strong competition, with its good service, top quality machines, cost-efficient processes and superlative surface finishing, SURTEK knows how to come out on top. According to SURTEK, persuasive arguments for purchasing an OTEC centrifugal disc finisher include the best splitting system, the longest warranty (including for wearing parts), the best quality components and the vast spectrum of machine versions – suitable for every customer requirement. Another advantage is sample processing, which enables companies to show customers what their workpiece will look like with a perfect surface finish. The results speak for themselves: over 500 OTEC machines sold in the last 10 years are a measure of SURTEK's success. ■

**Serhan Alyanak has been an exclusive dealer of OTEC products in Turkey since 2003. The founding of SURTEK in 2005 not only enabled the company itself to expand, but also added cleaning and ultrasonic systems to its product portfolio. These systems now extend the range of surface finishing products.**



# TRADE FAIRS **autumn/winter 2018**

In autumn and winter 2018, we and our distributors will attend several national and international trade fairs. For an overview of all events, please visit: **www.otec.de.**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