/ BACKGROUND ARTICLE // NOVEMBER 2022

ultraTEC – specialists in ultrasonic deburring

Many machining processes produce unwanted burrs and protruding fibres on components and to remove these automatically and in a contact-free manner, ultraTEC innovation GmbH has developed an innovative process. The technology company based in the Swabia region of southwestern Germany uses the power of ultrasound to deburr metal and plastic components.. Since July 2022, the start-up company founded in Laupheim in 2019 – has been part of the VOLLMER GROUP.

"When we founded our company three years ago, we based our foundations on our son Jonas' successful project on ultrasonic deburring as part of the ‘Jugend forscht’ initiative, my wife's economic expertise and my will to turn these into a start-up company," said Dieter Münz, CEO of ultraTEC innovation GmbH. "Today, we offer four different ultrasonic deburring systems and with VOLLMER, we have an experienced partner at our side to help us bring our technology to customers worldwide."

Successful ’Jugend forscht’ project with Rayleigh waves

At the ‘Jugend forscht 2019’ German national youth competition for STEM subjects, 17 year-old Jakob Rehberger and 16 year-old Jonas Münz were awarded the German President's Prize for Outstanding Work – acknowledging them as the best young scientists. Under the project name ’ultraTEC – and the burr is gone!’, they presented an ultrasonic deburring process that could deburr titanium bone implant screws used by doctors. Previously, it was only possible to use ultrasonic deburring on components made from plastic or aluminium. The young researchers were able to generate Rayleigh waves via indirect ultrasonic irradiation. Other than that, Rayleigh waves are generated during earthquakes and are feared because of their destructive potential. In the ultrasonic deburring process, the force of the Rayleigh waves are used in a targeted manner to even deburr components' internal edges and the smallest cross holes in a contact-free and process-safe manner.

"Jugend forscht" project transformed into a family-run business

Even before his victory at the ’Jugend forscht’ competition, Jonas's parents – Iris and Dieter Münz – had already decided to turn the project into a business. The– ultraTEC

Anlagentechnik Münz GmbH company name drew inspiration from the name of the project. Less than a year later, the Laupheim-based start-up developed its first market-ready ultrasonic deburring system and brought it to market. Two years later, in the summer of 2022, the start-up found a strong partner to build o its global sales and brand identity in the form of the Biberach-based VOLLMER Group.

The company now operates under the name ‘ultraTEC innovation’. **The technology guides components along in a water basin that uses the tip of an ultrasonic sonotrode, whose generated vibrations cause the burrs and fibres to break-off in an energy-efficient manner.** This contact-free ultrasonic deburring process with the patented sonotrode remains the foundation of ultraTEC. No matter whether you are drilling or milling – as soon as you machine metal or plastic, unwanted burrs and fibres are produced on edges, cross holes or surfaces. In addition to deburring common metals, ultraTEC systems can also be used with components made from various titanium and nickel alloys, brass and fibre-reinforced plastics.

Ultrasonic deburring with high-frequency sonotrodes

In the process developed by ultraTEC, components are stimulated by a generator. The high-frequency ultrasonic sonotrode oscillates back and forth 20,000 times per second over 0.1 millimetres. These generated vibrations move burrs and fibres back and forth until they are broken off, leaving sharp edges in a process-safe manner. Users can dispose of the processed water without any environmental concerns and further treatment.

Compared with commonly used processes, ultrasonic deburring is the only process that can be carried out fully automatically and virtually independently of the material. The method is contact-free, energy-efficient in a process that can be validated. In comparison to thermal processes, where burrs are thermally deburred, partsmay discolour and distort. Likewise, ECM (electrochemical machining) processes are often not possible with small components because these components' material removal rate cannot be defined. For comparable parts, high-pressure waterjet deburring is the preferred method. This requires around 20 times more energy than ultraTEC's ultrasonic deburring systems. Ultrasonic deburring is also an alternative for components that are difficult to deburr and currently require manual deburring.

Ultrasonic deburring system features a digital control

On ultrasonic deburring systems, individual components are guided along the firmly

anchored tip of the sonotrode at a defined angle with the aid of an industrial robot that can operate 24/7. For micro parts that cannot be gripped with a robotic arm, ultraTEC has developed a process where the sonotrode flexibly sits on the robot arm and is guided along the component. Tool manufacturers and machine manufacturers can also use ultraTEC systems to gently deburr sensitive surfaces. The targeted process enables selective deburring on individual edges or cross holes. The range of components that can be processed extends from micro parts for the optics or watchmaking industry, precision tools for machining and right through to 20-kilogram elements used mechanical engineering or vehicle construction.

Digital control of ultrasonic deburring

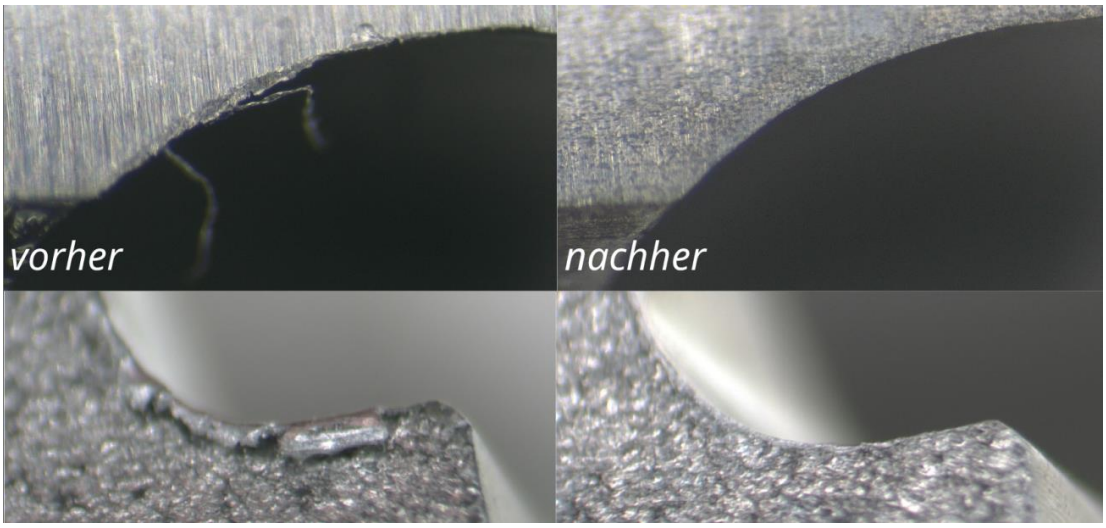
The programming of an ultrasonic deburring system is similar to the CAM programming of machining centres and is created offline. For this, a STEP file of the component is loaded into the CAM system, graphically positioned, the edges and points are defined and then a conventional postprocessor run is carried out. In addition, the operation can be simulated beforehand using a digital twin and the deburring process can be monitored. This ensures safe and precise deburring, particularly for new components. Using IoT-based (Internet of Things) remote maintenance modules, the machine control can be web-basedto rectify issues without an on-site service visit. The digitalisation of ultraTEC systems is to be further expanded with the support of the VOLLMER Group.

"VOLLMER will only have a minor impact on the innovative spirit of the Münz family's outstanding start-up," said Stefan Brand and Jürgen Hauger, CEOs of the VOLLMER Group. "Above all, we see our task in expanding the immense technological market potential of the method and the current team. We also want to use our experience to advance the global sales, service and marketing for current and future ultrasonic deburring systems using our years of experience."

(Approx. 6900 characters)

Press images

Caption: The A25 ultrasonic deburring system from ultraTEC innovation, a VOLLMER Group company, can be used to remove unwanted burrs and fibres from machined components.



Caption: Burrs and fibres on cutting edges can be broken off with sharp edges in a process-safe manner thanks to the processing with the ultraTEC ultrasonic deburring system.

Caption: Iris and Dieter Münz (centre) agreed to a majority shareholding by the VOLLMER Group in their ultraTEC start-up on 1st July 2022. The Biberach-based sharpening specialist was represented by CEOs Dr Stefan Brand (right) and Jürgen Hauger (left) when the agreement was signed.

About the VOLLMER Group
With its comprehensive range of machinery, the VOLLMER Group – which has sites in Germany, Austria, Great Britain, France, Italy, Poland, Spain, Sweden, the USA, Brazil, Japan, China, South Korea, India and Russia – enjoys global success as a tool machining specialist in the areas of both production and service. The range of products offered by this leader in technology includes the most advanced grinding, eroding, laser and machining tools for rotary tools and circular saws in the woodworking and metalworking industries, as well as for metal-cutting band saws. VOLLMER relies heavily on the traditions and advantages of the company – close cooperation channels, quick decisions and the fast responses of a family-run business. The VOLLMER Group currently employs approximately 800 workers worldwide, with around 580 of these at the main headquarters in Biberach alone, including more than 75 trainees. The company invests around eight to ten per cent of its turnover in the research and development of new technologies and products. As a provider of technology and services, the VOLLMER Group is a reliable partner to its customers.

Further information and relevant images are available at:
http://www.vollmer-group.com/en-uk/company/press/press-releases.html

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