

News from the surface technology 2022/1

Digital CHIP Journal

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1. FUTURE-ORIENTED TECHNOLOGY AND SERVICE PORTFOLIO

Products, manufacturing technologies, business processes, markets and supply chains are undergoing a rapid change. Entire industries are re-aligning their business approach. Decarbonization and the saving of valuable resources are becoming important competitive factors. These transformational developments are posing all kinds of challenges for manufacturing organizations. Flexibility and speed are in high demand.

Our broad, forward-looking portfolio of technologies and services allows us to provide efficient and sustainable answers to any problems in the field of surface treatment: Our solutions ensure that the surface refinement operations at our customers are running efficiently and are cost-effective. They include advice about processing issues, the development and optimization of finishing processes, the customer-focused design and production of equipment and consumables, the worldwide customer service and the professional qualification/training of the customer employees at the Rösler academy. Our specialists around the world are ready to assist you at any time. Through an intensive

information exchange with the experts at our main office they make sure that, irrespective of where your company is located, or which industry it serves, you receive the best possible advice. On the following articles you will find various examples from the shot blasting and mass finishing fields.

We can also support you in the implementation of your climate goals. Maximum energy efficiency and saving of valuable resources, for example, with an effective process water cleaning and recycling system, are essential performance criteria for our products and our own production. Our product developments from the Rösler Smart Solutions portfolio offer additional and important functions, which support the digitization of the customer's manufacturing processes and further optimize the performance of our systems. With comprehensive investments we are pursuing the long-term, sustainable development of our company. Sustainability is not just a slogan for us, but we consider it as a major social responsibility. This newsletter informs you about our various activities in this field.

The currently prevailing supply issues are po-



Volker Löhnert, Managing Director

sing significant problems. For this reason, at the moment we are using a large portion of our resources to cope with this situation and to make sure that we keep our promises and maintain the high Rösler quality standard.

In the current issue of our newsletter you will find many interesting developments and innovative processing solutions.

Best regards,
Volker Löhnert

2. US GIANT WHEEL PROS PURCHASES 41 RÖSLER WHEEL FINISHING MACHINES

Torq Thrust – an automotive wheel model developed in the 1960s by American Racing – is the most famous and most copied wheel design of all times. And it has not lost any of its attractive appeal. In 2008 Wheel Pros, a leading manufacturer and distributor of top brand wheels took over the brand and in 2020 decided to “reshore” the production from China back into the United States. For this purpose an entirely new production line was set up in Auburn, Alabama. During his time as owner of the competitive brand MHT, now also a part of the Wheel Pros group, the vice president for marketing at Wheel Pros had a highly positive experience with Rösler. Therefore, he recommended this surface refinement specialist as partner for the surface finishing of around 50,000 wheels per year. A major requirement was that the cast aluminum wheels with diameters from 15 to 20 inches and widths between 7 and 9 inches are finished fully automatically. Another demand was that the mechanical process achieved an absolutely repeatable high luster finish comparable to the previous manual polishing operation within relatively short cycle times.

41 Rösler special wheel finishing machines and one Rösler wet blast system

In close cooperation with the mass finishing experts at the Rösler headquarters in Untermerz- bach, Germany, Rösler USA developed a suitable multi-stage finishing solution. In a first step the surface of the cast and partially machined automotive wheels is homogenized with a wet shot blast process. For this purpose a standard wet blast machine was specially adapted to the specific task at hand. The machine is equipped with a rotary table and six blast guns mounted to adjustable mounting brackets in the blast chamber. Loading and unloading of the work pieces takes place manually, whereas the actual finishing process runs automatically.

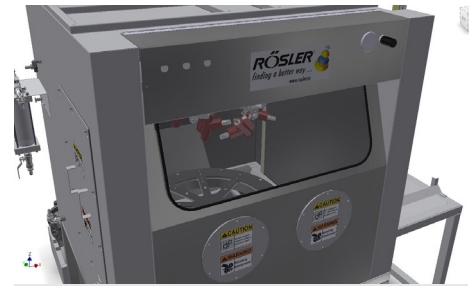
The wet blast process is followed by a 3-step mass finishing operation in the compact FBA 24/2 Turbo vibratory systems that were specially developed for wheel finishing. These machines, equipped with 2 vibratory motors mounted to the outside of the processing bowl, allow the finishing of automotive wheels with diameters of up to 24 inches within exceptionally short cycle times. The infinitely adjustable speed of the vibratory motors and the flexible motor position permit the perfect adaptation to different

processing tasks. For the finishing process the wheels are mounted to a specially developed fixture that can be pneumatically raised. This ensures not only that the wheels can be loaded and unloaded ergonomically but also that the processing media can remain in the processing bowl during the work piece load/unload operation.

The first finishing step consists of a pre-grinding operation. Since it lasts around 2 hours, 19 of the 41 finishing machines are dedicated to this first process step. The required processing time for each of the subsequent pre-polishing and polishing stages amounts to one hour. Therefore, only 11 machines are needed for each of these two stages. Since Rösler also develops and supplies the processing media, these are perfectly adapted to the various process stages. To allow an environmentally sustainable operation, the contaminated process water is cleaned by centrifuges and can, therefore, be recycled back to the mass finishing process. For this purpose Wheel Pros purchased two fully automatic Rösler centrifuges, model Z 1000.

Virtual pre-commissioning of the machines

The new wheel manufacturing line at Wheels



The wet blast machine, specially adapted by Rösler USA for the finishing application at Wheels Pros, creates a homogeneous finish on the cast and machined wheels. This is extremely important for the subsequent mass finishing process.

Pros is scheduled to start operation in April 2022. The pre-commissioning of the first 11 wheel finishing machines took place virtually in September 2021. The 3-step finishing process in the FBA 24/2 Turbo machines was broadcast by live stream from Germany to the United States. Beforehand, the wheels used for the pre-commissioning had undergone a wet blast process at Rösler USA. On this occasion the colleagues at Wheels Pros, connected online with Rösler Germany, noticed that the automatic mechanical finishing process produced significantly better results than the manual finishing operation used to-date.



The pre-commissioning of the first 11 wheel finishing machines took place virtually in September 2021. With a live stream the 3-step mass finishing process in the FBA 24/2 was broadcast from Germany to the United States.

3. LINDE MH RELIES ON A STURDY FOUNDRY VERSION OF CONTINUOUS FEED SPINNER HANGER BLAST MACHINE

Linde Material Handling (MH) is a globally leading supplier of fork lift trucks and warehousing equipment. The company also provides technical solutions and services in the field of intralogistics. With a sales and service network in more than 100 countries the company is represented in all major regions of the world. In Weilbach the material handling specialist manufactures the counterweights for its broad program of fork lift trucks.

Taking advantage of the potential for optimization with a new shot blast machine

Linde MH is continuously striving to improve its manufacturing operations. Therefore, a Linde project team and the Rösler Oberflächentechnik GmbH worked closely together to optimize the material flow and increase the overall flexibility of the shot blasting operation for different lift truck counterweights (in short LTCW). To fulfill the demand for a better utilization of the available space, Rösler developed a customized system around a continuous feed spinner hanger blast machine RHBD 22/27-F that is setting new standards in the foundry industry.

Fully automatic and flexible operation within an integrated manufacturing system

Within the scope of the newly laid out material handling process the raw castings are deposited in a specially reserved, clearly marked staging area in front of the inlet chamber of the blast machine. After an operator has manually positioned the castings and confirmed this step at the control panel, they are picked up by a power & free system for transport through the shot blast machine. For each work piece type specific shot blasting and transport parameters were defined and stored in the respective PLC programs. This ensures that after the shot blasting operation the LTCWs are perfectly clean with no traces of residual molding sand. At the same time they have a highly homogeneous surface roughness that displays the typical casting structure of the work pieces, even after they have been painted. All process parameters

were established on the basis of a suitable operating mix of the selected blast media.

Special foundry version of the shot blast machine RHBD 22/27-F

In compliance with the customer requirements the new shot blast machine was installed at its designated location in the factory. In a very tight space, but easily accessible for maintenance, the return system for the mix of blast media and sand was placed below the shot blast machine. Also integrated into this system was the return of the molding sand carried into the work piece staging area by the LTCWs. For this purpose, the sand is guided to a cross-chute located in front of the shot blast machine. This cross-chute then carries the material to the sand transfer hopper that transports the sand from LTCWs at the staging area and the sand from the inlet chamber onto the return conveyor below the inlet chamber. The return conveyor transfers the collected sand to the central screening hopper below the blast chamber. At the outlet chamber of the shot blast machine a floor scraper returns any residual sand and blast media to the central screening hopper below the blast chamber. The screening hopper separates all sand clumps, burs and metal flashes and transfers them to a sturdy Z conveyor belt for discharge from the machine. The screening hopper transports the remaining sand/media mix to an elevator, from where it is carried to the highly efficient media cleaning system. This device, consisting of a dual stage magnetic separator and an air wash system, ensures a high cleaning efficiency, guarantees a trouble-free operation and minimizes the wear of the shot blast machine.

After the LTCWs have been manually positioned in the staging area, they are picked up by the trolleys of the power & free work piece transport system and carried through the different machine sections inlet chamber, blast chamber and outlet chamber at certain indexing time intervals. The three-chamber design of the shot blast machine also helped to minimize the escaping of sand, blast media and dust into the immediate environment.

At the center of the entire shot blast system is the blast chamber with five specially placed blast turbines. The chamber is made from wear



At the center of the entire shot blast system is the blast chamber with five specially placed blast turbines. The chamber is made from wear resistant austenitic manganese steel, grade X120Mn12. For additional wear protection the chamber is lined with 25 mm thick replaceable cast chromium plates.

resistant austenitic manganese steel, grade X120Mn12. For additional wear protection it is lined with 25 mm thick replaceable cast chromium plates. A large maintenance platform, easily accessible by stairs, greatly facilitates the required maintenance activities.

All goals achieved!

With the new Rösler continuous feed spinner hanger shot blast system the demands by Linde MH for a technically and economically optimized shot blasting operation & work piece handling could be fully met. The quality requirements for the LTCW components are fulfilled through precisely defined shot blasting parameters, optimized blast patterns and better wear characteristics. Overall, this resulted not only in a significant improvement of the shot blasting results, but the streamlined shot blasting and transport concept also increased the overall efficiency of the material flow in the factory.



A floor scraper in the outlet chamber transfers residual sand and blast media to the screening hopper below the blast chamber. From there the mix is transported to the blast media cleaning system.



The cross-chute and sand transfer hopper transport the loose molding sand to the screening hopper below the blast chamber.

4. FULLY AUTOMATIC CLEANING OF 3D PRINTED PLASTIC COMPONENTS FOR RECREATIONAL VEHICLES WITH A S1 SHOT BLAST MACHINE

The continuous improvement of its vehicle designs and materials is one of the reasons for the success of Knaus Tabbert, a leading manufacturer of mobile homes, camper trailers and panel trucks in Europe. Of course, in its innovation efforts the company is also utilizing new manufacturing technologies such as additive manufacturing (AM). With the powder-bed based 3D printing technology Knaus Tabbert is producing prototype as well as standard components. „Within the framework of our 3D printing activities the de-powdering and cleaning of the printed components has been a serious problem. These operations had to be done by hand in a manual blast cabinet. This was not only time-consuming and expensive but also produced a surface finish with a really poor quality”, explains Mario Meszaros, Development Engineer at Knaus Tabbert.

Key requirements - flexibility, processing quality and quick amortization

During their search for an automated post processing solution Knaus Tabbert's project engineers came across AM Solutions – 3D post processing technology, a brand within the Rösler group that specializes in post processing solutions for 3D printed components. After numerous shot blasting trials with different components in the Customer Experience Center of AM Solutions, the S1 shot blast system

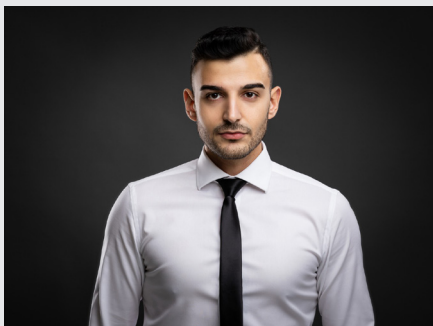
proved to be the best post processing solution.

This ATEX compliant shot blast machine was specifically developed for the fully automatic post processing of entire batches of polyamide plastic components produced with powder bed printing systems. If the components must be blasted manually, the control panel allows an easy and quick switch to manual operation without requiring the usually necessary retooling. The compact plug-and-play S1 is the only machine on the market that allows de-powdering as well as finishing processes, such as surface smoothing and homogenization, in one single machine. This requires only a simple change of the blast media, for example, from glass beads to plastic spheres.

Mario Meszaros adds: „We were really impressed about how clean the components came out of the machine after a comparatively short cycle time“. A ROI calculation based on actual operational data, showed that with only three print jobs per week the entire investment will be fully amortized within a period of only two years. Mario Meszaros concludes: „Because of a steadily increasing quantity of 3D printed components in our vehicles the S1 system will amortize itself a lot faster“.



On the one hand, Knaus Tabbert uses 3D printing to produce prototypes. On the other hand, this technology is also used to produce series components, such as a bracket for an alarm system or the hinge mechanism of the swing-out shower cabin. An S1 system from AM Solutions- 3D post processing technology is utilized for the post processing.



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5. SUSTAINABILITY STRATEGY 2030: MORE THAN JUST CLIMATE NEUTRALITY!

A sustainable and socially responsible business approach is the guiding principle for Rösler to achieve its vision of becoming the globally leading customer-focused company in the field of surface refinement. By being designed for maximum energy efficiency and a long service life, the products and digital solutions reflect a strong commitment towards environmental protection and sustainability. At the same time they support our customers to make their production more eco-friendly and more efficient. On the other hand, investments in our own production allow us to continuously reduce the CO2 foot-print. For example, the ceramic media production was equipped with new, energy-efficient kilns allowing a highly effective heat recovery. In addition, in May 2020 a photovoltaic installation with a total area of 7,000 square meters was commissioned. The expected total annual power generation amounts to around 1,000,000 kilowatt hours (kWh) of green electricity. This will be used for the company's own energy requirements and the charging stations for electric vehicles. The CO2 reductions resulting from these two investments amount to around 600 tons.

Moreover, during the past years Rösler has extensively invested in improving its internal logistics. In the company's high-bay warehouse the bay operator panels are equipped with an energy recovery system. It allows utilizing the energy surplus produced during the travel process for lifting and moving operations and, thus, reduces the energy consumption. In addition, the use of diesel-powered lift trucks has been continuously reduced. Among other systems modern DTV vehicles (DTV = Driverless Transport Vehicle) with rechargeable lithium-ion batteries are utilized. These ensure a smooth material flow between the production and warehousing locations. While a few years ago the

pallets were predominantly moved as single pieces, today they are transported to the work places on ergonomic transport frames by electrically operated trolleys. This allowed reducing the actual material movement by 20 % and significantly improved the overall material handling operations.

Sustainability is more than just climate neutrality

For Rösler the term "sustainability" means a lot more than just becoming climate-neutral. Therefore, in its sustainability strategy 2030 the company formulated other action plans with a whole range of short-,

medium- and long-term targets: "Environment, saving of resources, human aspect / employees and customer / products / market".

In the field "environment" the company's short-term focus is on the direct and indirect emissions as outlined in scope 1 and 2 of the greenhouse gas protocol (GHG). In addition, the company is undertaking efforts to identify the scope 3 emissions that are generated along the entire supply chain. In order to also recognize "hidden" action plans, within the near future the company will, jointly with the Fraunhofer IAIS, conduct a climate impact check.



The photovoltaic systems in Hausen and Memmelsdorf have total area of 7,000 square meters.

6. INVESTMENT IN THE PRODUCTION SECTOR OF OVER ONE MILLION EUROS

A significant investment at the Untermerzbach location represents a major milestone towards preparing the Rösler equipment production for the future. The new CNC moving column milling and drilling center will further improve the already high quality of the Rösler equipment and increase overall productivity. The new machi-

ning center allows the extremely flexible processing of large components with a length of up to 7,000 mm and a width of 3,100 mm. Due to the shuttle machining capability one set of parts can be processed, while another set is being prepared. The CNC moving column milling and drilling center in the Rösler CI department will

not only help improve quality and productivity. Because of its impressive size this state-of-the-art machine will also become an attractive highlight for walking tours through the production department in Untermerzbach.



Full view of the moving column milling and drilling center.



Turning operation for a "drum housing" on the milling center.

Surface Finishing

is our DNA

Mass Finishing

Efficient systems engineering and innovative technologies – powerful and economical

Shot Blasting

Individual systems engineering and intelligent process solutions – reliable and energy efficient

AM Solutions

The full solution provider for 3D post processing equipment and 3D printing services