

# Shot Peening



# Shot blast systems, working in perfect harmony



Rösler shot blasting is synonymous with technological leadership in the field of mechanical surface treatment. Besides innovative products and services we offer our customers a comprehensive knowhow in surface treatment methods as well as the expertise for integrated manufacturing solutions.

With custom engineered technical solutions we bring a high degree of quality and cost efficiency to our customers, providing them with significant competitive advantages.

When it comes to the two most important surface treatment fields, namely mass finishing and shot blasting, Rösler is the only equipment supplier in the world who can offer both. You simply present your surface treatment problems to us, and we in turn will develop the economically and technically most suitable solution for you in our test and demonstration centres.



Rösler shot blasting machines generally distinguish themselves with many innovative technical details. Our company has successfully transformed decades of experience into modern equipment concepts. In both fields, mass finishing as well as shot blasting, we develop customer oriented solutions, which can be easily integrated into fully automatic manufacturing processes. Our shot blast surface finishing and surface preparation systems are generally characterised by their state-of-the-art technology and with the highest emphasis on cost efficiency.

If special importance are our heavy duty blast turbines, which offer significant increases in productivity with, at the same time, reduced operating costs.



As the only single source manufacturer and supplier of mass finishing and shot blasting systems we are the global market leader for equipment and process technology in the field of surface treatment (deburring, descaling, polishing, grinding, etc.) of component parts made from various metals, plastics and other materials.

Our customers can be found in a wide variety of industries. They all rely on the fact that Rösler offers them by far the best surface treatment solutions in the market. "Innovation is our strength" is not just a slogan. We quickly react to the constantly changing technological market environment with up-to-date processing solutions. At the same time, we are constantly searching for new fields of applications for our technologies and, by doing so, we are able to develop innovative surface treatment processes combining a consistently high quality surface finish at the lowest possible costs.



DIN EN ISO 9001 and 50001



## Test centres around the world

The test centre for mass finishing and shot blasting at the headquarters of the Rösler group in Untermerzbach, Germany has:

- Nearly 100 different mass finishing and shot blast machines
- On an area of about 2,700 m<sup>2</sup> (27,000 sqft)

You will find similar test centres and expertise at our branches in USA, UK, France, Benelux, Spain, Turkey, Romania, Italy, Austria, Switzerland, Russia, Brazil, Serbia and India.

## Complete process solutions

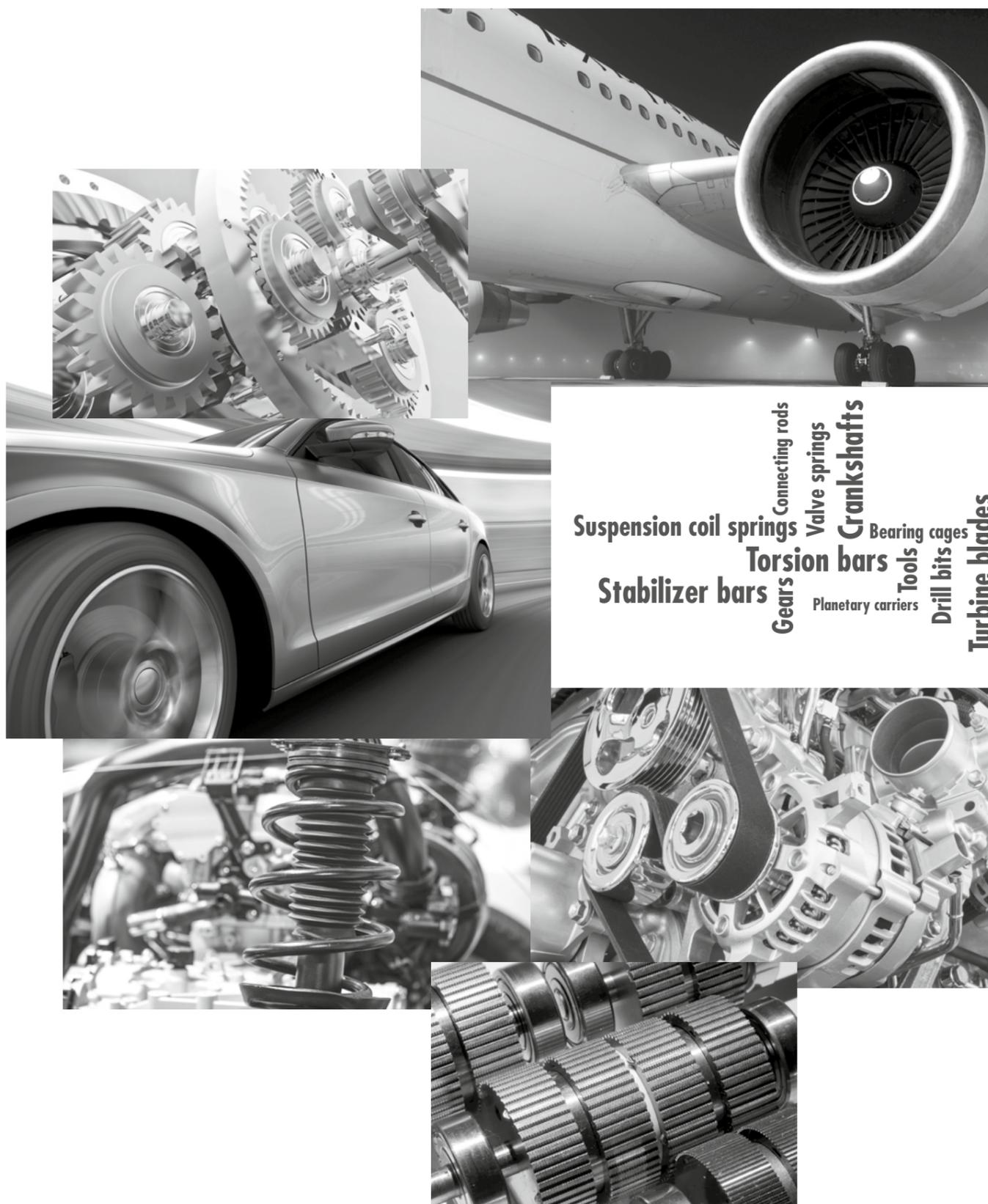
Besides demanding high quality, environmentally safe and efficient products, we find our customers also prefer to purchase all process components from one single source. That is why we offer not merely the processing equipment but the complete package, with perfectly matched consumables. This guarantees the best peening results, with absolute process safety. Our global service teams take care of the delivery and the installation. Qualified engineers train our customers, right on location. Of course, our after-sales service members will answer all your questions. A quick supply of all spare parts and professional consultation by our experienced process specialists, ensures that your finishing processes are always running smoothly.

## Team spirit

Rösler is a dynamic company, in which the initiative and commitment of each single employee plays a key role. Systematic, ongoing training and a cooperative management style combined with a lean organisational structure are key elements of our people orientated philosophy. Naturally, our comprehensive apprentice program ensures that today we are already grooming the skilled employees of tomorrow.

# Fields of application / Examples of applications

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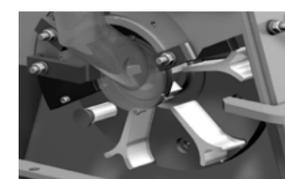
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If your mobile phone is equipped with a QR-code detection software, you can view the technical data directly; otherwise, you can call them off through <http://data.rosler.com>



## Swing table blast machine RWT

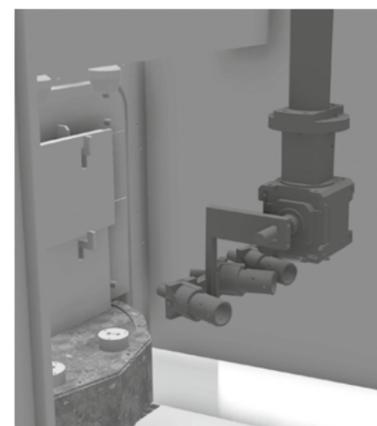


The Rösler swing table blast machine was developed for treating transmission components such as; for example, gears, crown wheels, bevel gears or shafts. The machine is divided into two zones, the externally located work piece loading/unloading zone and the blasting zone. A partition divides the rotating table into two 180° segments. Depending on the required throughput, this machine can be equipped with 2, 4 or 8 satellite stations. While the blast / peening process takes place in one segment, work pieces can be loaded/unloaded in the other segment. The transmission components can be loaded/unloaded by hand or fully automatically. Once the work pieces are placed into the satellites, the main table indexes by 180°. After the special sealing system is activated, the work pieces are clamped by a hold down device, and the blast / peening process starts. At the same time, in the external zone, work pieces can be loaded/unloaded. The work pieces are rotated during the entire blast / peening cycle. Depending on the work piece dimensions, the blast nozzles are capable of being moved with a servo motor, allowing the tracing of the work piece contours and the targeting of specific surface areas.



### **Blast system**

Swing table machines can be equipped with 8 (RWT 10), respectively with up to 16 blast nozzles (RWT 13). A dual vessel pressure blast system ensures that the blast cycle will not be interrupted. A special machine version allows the running of dual peening processes.



### **Blast chamber**

The blast chamber is made from wear resistant manganese steel. The machine itself is equipped with a side door allowing easy access to the work area, for example, for adjustment of the blast nozzles or maintenance work. In addition, the blast chamber is protected by a noise absorbing, wear lining.



### **Rotation control**

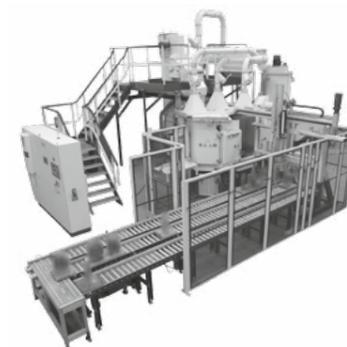
The treatment of transmission components requires sophisticated process controls to make sure that the specified blast results are achieved. For this purpose, the RWT blast machines are equipped with a hold down device with integrated rotation control of the satellite stations. The actual clamping takes place in the blast zone. The mechanical portion of the hold down device is located on the outside of the machine.



# Rotary table blast machine RDT-S

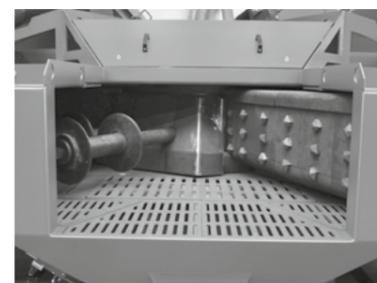


In this Rösler Model RDT-S rotary table blast machine, the table is divided into several sections separated from each other by partitions. On the edges of each of these partitions, permanent magnets are placed within, which attracts the metallic peening media to adhere - closing any gaps between the machine housing and the partitions. This is a highly effective sealing system. The RDT-S is available with various satellite and turbine configurations.



## Automation

A step gear motor guarantees the precise movement and positioning of the table. With the placement of the satellite stations on the table also being very precise, automatic work piece loading/unloading with handling systems or robots can be easily implemented.



## Magnetic seal

Instead of the usual rubber or labyrinth seals, the RDT machines contain a seal with an artificially generated layer of blast media. For this purpose, permanent magnets are built into the partitions. During the blast process, a blast media sealing barrier is generated around the magnets. After each blast cycle the media seal, is wiped off.



## Turbine placement

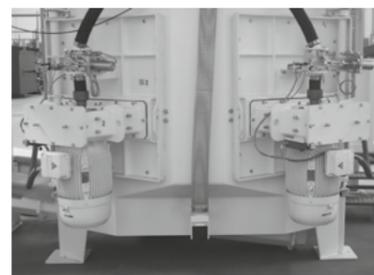
The placement of the blast turbines is flexible and depends on the respective peening application. The turbine position and angle is determined by the work piece shape and size. Furthermore, the design of the turbine casing allows any future modifications.



## Satellite table blast machine RST



Rösler satellite table blast machines are specially designed for treating transmission components. This machine type is equipped with a main table containing a total of 15 satellite stations. In the front of the machine, the satellites are easily accessed for quick unloading of finished and the loading of raw work pieces. After the load/unload cycle, the machine always indexes by one satellite position. The blast zone and load/unload zones are separated from each other by lifting gates and multiple rubber curtains. Two satellite stations are always positioned in front of the turbines. Depending on the work piece size and shape the turbines can be placed on the cabin sidewalls or roof for optimum blast coverage. During the blast cycle, the satellites rotate in front of the turbines. Prior to indexing to the load/unload station the satellites pass through a blow off station to remove any residual blast media from the work pieces.



### **Turbine placement**

The turbine placement is always adapted to the respective work pieces and the customers blast specifications. A vertical, as well horizontal placement is possible. If needed, the turbines can even be placed on the cabin roof. For easy accessibility the turbines are mounted onto hinged doors. This also allows quick access to the blast chamber.



### **Ergonomic work piece loading/unloading**

The design of the blast media collecting funnel and the media auger allows for manual work piece loading/unloading at an ergonomic height. Of course, automatic loading and unloading is also possible.



### **Maintenance**

Several doors allow access to the blast area for quick and easy maintenance. When placed on the sidewall, the turbine(s) can be mounted to the maintenance door(s). This improves the accessibility to the blast area even further.



## *Swing chamber blast machine RWK*



The Rösler Model RWK, swing chamber blast machine is truly an all-round system that can be used for many different peening applications. Since this machine type is designed as a dual chamber structure, it allows one set of work pieces to be loaded/unloaded, while another set is processed. For reliable fixturing of the work pieces, RWK machines are equipped with a pneumatic and respectively, for stress peening of coil springs, with a hydraulic clamping device. The placement of the turbines on the back wall is flexible and depends entirely on the work pieces

## *Continuous feed rotational peening machine RRDK*



The Rösler Model RRDK, continuous feed rotational peening machine has been designed for peening suspension coil springs. On the loading side, the springs are placed between two rotating shafts. The distance between the shafts can be adjusted to the spring diameter. An endless, moving chain is equipped with pusher pins, passing between the two rotating shafts. The springs are placed between two of these pins, which are literally pushing them through the machine.



## Tumble belt blast machine RMBC



RMBC tumble belt machines are ideal for treating large quantities of work pieces that are not impact sensitive in batch mode. They are equally effective for the treatment of small, delicate plastic parts and large, heavy steel components. During the blast cycle the parts are constantly tumbling or gently cascading over each other ensuring effective, all-around blast coverage. The intensive contact between the work pieces accelerates the deburring process or the knocking out of core sand from castings.

Between One (1) and up to three (3) high performance turbines guarantee homogeneous blast results in very short cycle times. The endless belt made from perforated rubber or carbon steel, or respectively, manganese steel slats have mixing strips to ensure an even presentation of the parts. The belt speed is adjustable for controlling the intensity of the tumbling /cascading action. RMBC machines can handle a wide spectrum of blast applications, be it shot peening, deburring or descaling of heat-treated components. Available in 5 different sizes, they can be equipped with high performance blast turbines or different air blast systems allowing the use of any blast media, whether metallic, mineral, plastic or prunus based.



### Blast chamber

- ▶ Internal wear lining made from manganese steel
- ▶ M-line seals protected against wear
- ▶ Manually operated cabin door secured by limit switch
- ▶ No exposed screw connections in the blast chamber



### Air wash separator

- ▶ Large separator width with special flap controlling the media flow
- ▶ Large drop height of the cascade for more effective media classification
- ▶ Independent air damper
- ▶ Easy to clean safety screen drawer
- ▶ Large volume blast media storage hopper with fill level sensor



### Automatic work piece loading / unloading

With custom engineered work piece loading & unloading concepts we increase the overall operational efficiency, minimise unproductive times and personnel costs. The integration of our tumble belt blast machines into existing manufacturing lines and implementation of fully automatic processing solutions is a key strength of our line of tumble belt machines. A wide range of equipment options allows easy adaptation to customer-specific requirements. For example, if gentle loading of delicate, large and heavy work pieces is required, the design focus must be on minimising any drop heights. For precise, weight-dependent and fully automatic work piece loading we have developed special weighing cells in combination with vibratory hoppers.

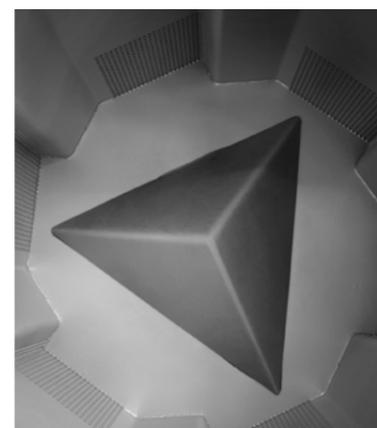


## Multi-tumbler drum blast machine RMT



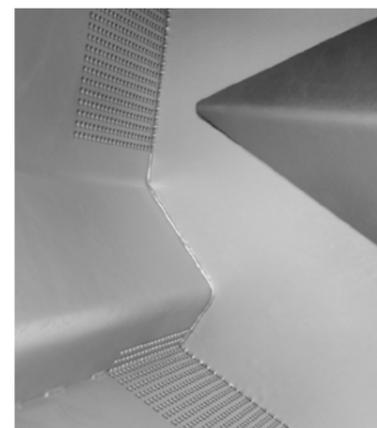
With regard to process component safety and batch integrity, multi-tumbler blast machines are unbeatable. During their development Rösler took into account many customer requirements and ideas. Whether the task is deburring, surface preparation (for example, roughening), blast cleaning or shot peening of parts that can tumble over each other, multi-tumbler systems offer unsurpassed performance. The new, optimised rotary drum has no pinch points whatsoever, thus preventing any damage to the work pieces. This allows safe batch integrity and optimal processing of extremely small and geometrically complex parts.

The dimensions of the work pieces that can be processed in RMT machines extend from a fraction of an inch to 24" (measured diagonally). The maximum piece weight amounts to about 100 kg (220 lbs.). With batch sizes from 80 liters (2.8 cuft) to 1,200 liters (43 cuft) the comprehensive machine program can handle a wide range of different shot blasting tasks. Homogeneous surface finishes and short cycle times are typical for any multi-tumbler application.



### ***Specially designed rotary drum***

Key to the excellent performance characteristics of the RMT blast machines is the geometry of the rotary drum. The inside wall of the drum is equipped with specially shaped mixing cams, while the bottom of the drum contains a three-sided pyramid. This unique geometry creates the innovative "multi-tumbler" effect. During rotation the cams cause a general mixing of the work pieces. At the same time, the pyramid in the drum bottom facilitates the mixing of the upper and lower work piece layers. With this "multi-tumbler" effect all work piece surface areas are equally and reliably exposed to the stream of blast media.



### ***Special perforation / treatment of very small work pieces***

Depending on the shape and size of the work pieces and the blast media, the drum can be equipped with specially perforated screens. This prevents lodging of the work pieces in the drum and, thus, guarantees absolute batch integrity. Even the smallest parts can be safely processed in the RMT.



### ***Ingenious work piece loading & unloading***

In order to match the multi-tumbler systems with the customer manufacturing environment, Rösler offers specially developed lift & tip loading systems, movable hoppers, weighing cells and various work piece transport systems. The design of all loading and unloading units reflects the technical characteristics of the RMT concept. Batches of up to 4,000 kg (8,800 lbs.) can be easily handled. And, of course, all our material handling components can be adapted to the dimensions of the customer work piece bins.

## Auxiliary equipment



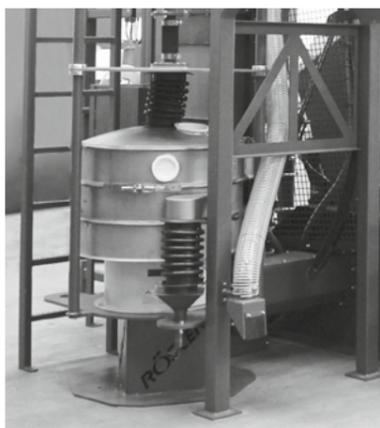
### **MagnaValves – Creation of an electromagnetic field for dosing the blast media**

When it comes to dosing of the exact blast media quantity to the turbines and for media replenishment, MagnaValves guarantee maximum process safety and precision. This system is based on a permanent magnet and an electromagnet. During the blast cycle the magnetic field of the permanent magnet is neutralized by sending current through the electromagnet allowing the media to flow. When no current is applied, the media flow is stopped. Since MagnaValves utilize no moving parts, they require little maintenance and sustain practically no wear. Versions equipped with a coil sensor allow the exact measurement of the media flow.



### **Spiral separators**

When steel shot is used, not only the shot size but also the shape must be controlled. The shot peening process is only effective with spherical media. Because of its brittleness steel media tends to break down causing it to become angular. This broken down media must be discharged with a spiral separator. The media is fed into the spiral separator at the top. Because of the centrifugal force and gravity, the "good" (round) media rolls down through the spirals, whereas broken down, angular media drops through the centre of the separator and is discharged. The relatively small capacity of spiral separators only allows their operation in by-pass mode.



### **Screening/classification systems**

In order to ensure the repeatability of the peening process, the blast media may have to be screened to ensure an even grain size distribution in the media operating mix. Frequently, such screening requirements are part of the shot peening specifications. Depending on the technical requirements, with pressure blasting applications the complete media quantity can be classified with a screening unit, or in the case of lesser demands, a smaller quantity can be classified in by-pass mode. Because of the high media quantities thrown, turbine blast processes only allow screening of the media in by-pass mode.



### **Control of the media hose**

Wear, especially in the media hose, can negatively affect the blasting results. To prevent this problem, a special media hose control is implemented. The actual media hose is placed within a second hose equipped with a pressure controller. If a leak in the media hose should occur, an alarm sounds, and the blasting process is stopped.



### **Rotation control**

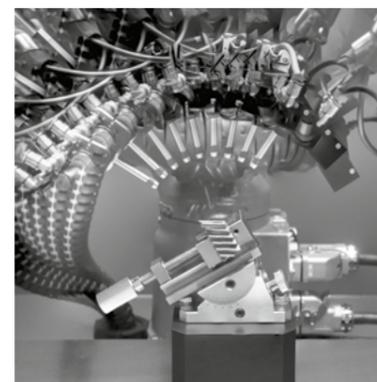
Frequently, work pieces rotate during the blast process. For such applications rotation controls are required to ensure stable, repeatable blast results. Whenever possible the rotation is not checked on the actual drives but at the work piece itself.



### **Visualisation**

For many shot peening processes, a clear and user-friendly display of all process phases is essential. Besides a basic visualization, Rösler also offers extended visualisation modules displaying additional information about the process. For more complex shot peening systems handheld operator panels are available.

## Rösler technical support (overview)



### Development phase:

- ▶ Determination of the process parameters in our test lab
- ▶ Compressive stress measurements including preparation of the work piece samples
- ▶ Careful documentation of all trials and measurements
- ▶ Determination of the equipment parameters based on the results of the peening trials, including preparation of a quote

### Order processing phase:

- ▶ Compressive stress measurements prior to and during the pre-commissioning phase
- ▶ Delivery of the equipment

### After delivery and final commissioning:

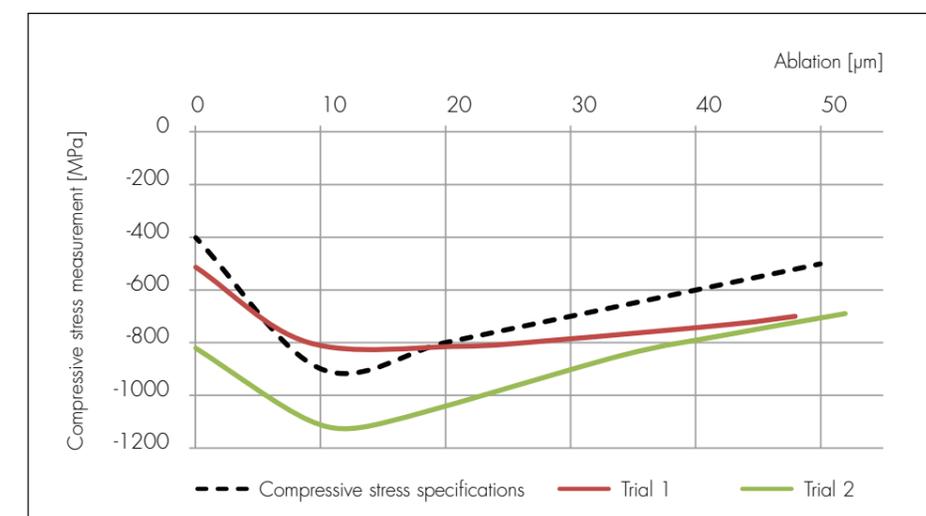
- ▶ Compressive stress measurements for control of the peening results after production startup
- ▶ Auxiliary measurements on Rösler as well as non-Rösler equipment during production

### Our process development approach:

You provide us with the required compressive stress parameters. For example, your work pieces are currently treated at a job shop. The detailed process parameters are not known. In future you want to bring this particular process in-house. This requires running peening trials with different parameters and blast media sizes. Conducting these trials, compressive stress measurements, process optimisation and specifying the required equipment, all these steps can take place at Rösler.

When it comes to developing new, innovative shot blast methods, Rösler is a true technological trendsetter. We offer our customers not only state-of-the-art products and services but also comprehensive application knowhow that allows us to tackle the most complex shot blasting tasks. Our focus is on user oriented technical solutions securing top quality and cost efficiency for our customers, thus providing them with significant competitive advantages. Especially with shot peening applications, detailed knowledge of all process parameters is essential. Our in-house X-ray diffraction lab allows us to quickly measure compressive stresses, an extremely important aspect in the development of any shot peening solution.

Thanks to an integrated robot our ultra-modern X-ray diffractometer permits the most complex measurements. With a specially developed electro-polishing method we can precisely measure material ablation in the work piece samples, which is essential to determine compressive stress curves in the upper surface layers of the samples. This investment enabled us to make measurements conforming to the standards ASTM 916 and EN 15305. And, with a specially developed software module we can analyse measurements in accordance with VW PV 1005 and Getrag GFT 4010. Please contact us for any further questions or requests.



Example: Compressive stress curve

## RetroFit - modernisation of existing shot blast machines



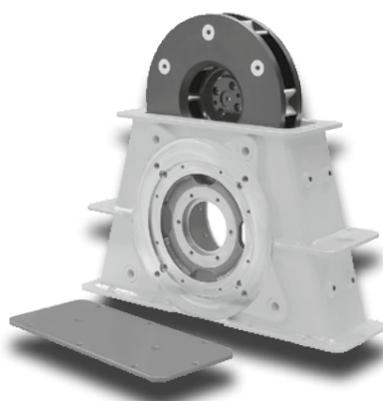
Higher productivity and cost efficiency – these are hot subjects in the field of surface treatment. To remain competitive, the owners of older shot blast machines must update their shot blast systems to bring them up to modern technical standards. Our “TuneUp” division is specialised in the technical modernisation of shot blast machinery of all makes. As market leader we can offer a wide portfolio of blast turbines and upgrade solutions for practically every conceivable application. This means not only exploiting cost saving possibilities by utilising energy efficient and low maintenance components, but also the cost effective adaptation of existing shot blast machines to changed operational requirements such as, for example, improved blasting results or higher work piece throughput.

### Turbines - unlimited technical possibilities

With its comprehensive knowhow our company can offer many solutions regarding the modernization of your shot blast machines. This includes the ingenious “RUTTEN” high performance blast turbines as well as the newly developed “Gamma G” family of turbines with Y-blades!

Reasons why you should take advantage of our RetroFit modernisation program include the following benefits:

- ▶ Reduction of your maintenance costs
- ▶ Reduction of your shot blast cycle times
- ▶ Reduction of your energy consumption
- ▶ Reduction of your blast media consumption



Patent 2533942

### MAX-IMP – blast pattern control

The patented, innovative MAX-IMP system consists of a surprisingly easy to handle sensor that helps to quickly adjust out-of-line blast patterns to their optimum position and, thus, maintaining an effective shot blast process. Placed directly in front of the turbine, during the blast process the sensor is moved into the hot spot for the analysis of the blast pattern. Thanks to an electronic evaluation tool the results are displayed within 3-5 seconds allowing adjustment of the blast pattern back to its ideal position.



## After-Sales-Service



### Round the clock technical support – for the entire life of the machine!

Whatever problems or questions you may have, we will provide you with expert support in practically any area:

- ▶ BUS measurements
- ▶ Process and operational expertise
- ▶ Global network of test centers
- ▶ Blast media analysis
- ▶ 24-hour hotline for round-the-clock blasting customer support
- ▶ Spare parts and wear parts for any make and model of blast machine
- ▶ Customer-specific maintenance plans
- ▶ Operation and maintenance training
- ▶ Machine overhauls
- ▶ Safety and environmental support
- ▶ Control and calibration of filter systems
- ▶ Conductor checks (in compliance with EN 60204-1)
- ▶ Machine checks (in compliance with European safety requirements 2009/104/EG)

### Maintenance and repair service

Our qualified service team stands ready to serve you in case of an emergency, as well as for scheduled repairs or maintenance work. With short reaction times and well-equipped service vehicles we can quickly repair your machine or perform maintenance work on site.



### Spare and wear parts – also for non-Rösler equipment

All shot blast machines are exposed to a certain amount of wear. Rösler maintains a large part inventory to guarantee a high availability combined with a quick delivery. If necessary we also deliver over night.





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