

Surface treatment of medical components



Mass Finishing



High-performance equipment and innovative technologies – productive and cost-effective

Shot Blasting



Customer-oriented equipment technology and intelligent process solutions – long-lasting and energy-efficient

AM Solutions



Comprehensive solutions for additive manufacturing, especially 3D post processing equipment

›80

More than 80 years of **experience**



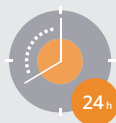
15 locations –
over **150** distributors –
over **1,500** employees **across the globe**



Worldwide **Customer Experience Center**



More than **15,000**
different types of media and compounds



Our technical service –
round-the-clock support



Transfer of professional knowledge
by certified trainers

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WHAT IS MASS FINISHING?

A technology proven over decades

Mass finishing is a mechanical-chemical technology for the surface finishing of a wide range of work pieces. Besides the actual finishing equipment grinding and polishing media as well as chemical compounds are utilized. This technology removes material from the work piece surface by the constant “rubbing” of the media against the work pieces. This “rubbing”

effect is induced by vibration, rotation or centrifugal force. The process intensity depends on the machine type, the consumables (media and compound), the machine settings and the processing time. We will gladly develop a finishing process for your individual requirements.

The mass finishing technology is used for treating:

- ▶ Work pieces made from metal, plastic, ceramic materials and elastomers
- ▶ Work pieces made by casting, forging, deep drawing, roll forming, sintering, stamping and coining
- ▶ Work pieces that have undergone a machining operation like turning, milling, drilling and grinding
- ▶ Work pieces that have undergone a heat treatment like annealing, tempering or hardening



RÖSLER MASS FINISHING SOLUTIONS

for medical components

The surface finishing requirements for medical components can be quite complex. Mass finishing offers different processing methods, which are tailored to the respective manufacturing stage and the utilized work piece materials. In the field

of orthopedic implants these materials include a variety of stainless-steel alloys, titanium or plastic. For prosthetic and orthotic components non-ferrous light metals and special plastic materials such as carbon fiber are utilized.

THE FINISHING GOALS FOR MEDICAL COMPONENTS

Deburring

The burs on the outer work piece contours, in drilled holes and other openings are removed or minimized in a cost-efficient manner by special machinery and grinding media.

Surface grinding and smoothing

The surface imperfections on work pieces caused by shaping or machining operations are removed, and the surface roughness is drastically reduced. Surface grinding and smoothing operations are indispensable for subsequent polishing processes or coating operations such as anodizing.

Dry polishing

In dry polishing operations the polishing media, specially adapted to the respective work piece material, generates a high gloss polish without any "micro scratches." Dry polishing methods produce surface roughness values of $Ra < 0.02 \mu\text{m}$ or $Rz < 0.15 \mu\text{m}$. Precondition for achieving these results is that the work pieces have undergone a surface grinding and smoothing operation in a mass finishing machine.

RÖSLER KeramoFinish® high gloss polishing

This is a special process, developed by Rösler, for the high gloss polishing of orthopedic implants and other medical components that must have a cosmetically appealing appearance. The surface roughness readings are reduced to $Ra < 0.02 \mu\text{m}$ or $Rz < 0.15 \mu\text{m}$. Precondition is that the work pieces have undergone a surface smoothing operation in a mass finishing machine.

Ball burnishing, pressure deburring and vibro peening

This mass finishing method utilizes media made from carbon or stainless steel. The high bulk density of the steel media exerts an extra high pressure on the work pieces.

Cleaning

Lubricants and other contaminants must be removed from the surface of the work pieces, before these can be processed in downstream operations:

- ▶ Part-on-part tumbling motion
- ▶ Combined methods: Cleaning with simultaneous deburring or edge radiusing

WHAT IS SHOT BLASTING?

A technology that makes a difference

In shot blasting the surface refinement (cleaning, peening, etc.) is achieved by throwing a blast media at a high speed (up to 170 m/sec) onto the work pieces. The acceleration of the media either takes place by compressed air, high pressure pumps or blast turbines. The blasting results depend on the machine type, the operating parameters and the blast media.

The shot blasting technology allows applying the same or similar surface treatments with different shot blasting processes. Based on the required results, work piece quantity, legal standards and your specific demands we will gladly propose a suitable shot blasting process. When working with Rösler you will receive the entire solution package from one single source.

The shot blasting technology is used for treating:

- ▶ Work pieces made from metal, plastic, ceramic materials, elastomers and composites
- ▶ Work pieces made by casting, forging, deep drawing, roll forming, sintering, stamping and coining
- ▶ Work pieces that have undergone a machining operation like turning, milling, drilling and grinding
- ▶ Work pieces that have undergone a heat treatment like annealing, tempering or hardening



RÖSLER SHOT BLASTING SOLUTIONS

for medical components

SHOT BLASTING SYSTEMS

Suction (injection) blasting

In suction blast systems compressed air is guided through a special blast gun. The venturi effect generates a negative pressure in the gun. This causes the blast media to be sucked into the gun from a separate supply hose and to be accelerated by the escaping compressed air. Suction blasting is a rather gentle shot blast method.

Pressure blasting

In pressure blast systems the blast media is stored in a pressurized vessel. Gravity causes the media to fall to the bottom of the vessel, where it is carried away by a stream of compressed air. On its way to the blast nozzle in special hoses the media/air mix is accelerated to its final speed. The blast nozzle produces a precise, highly concentrated blast pattern on the work piece surface. Pressure blasting is highly intensive and, therefore, covers large surface areas in a relatively short time.

Wet blasting

Mixing the media with water and accelerating this mix by a slurry pump and compressed air generates gentle processes, which produce particularly fine surface finishes.

High-pressure water jet blasting

Pure water is directed at the work piece surface with an extremely high pressure of up to 4,000 bar (58,000 PSI). This allows the removal of all kinds of coatings, residual sand and other surface contaminants. No foreign particles are contaminating the surface, and the cleaning speed is exceptionally high.

Shot peening

Work pieces exposed to heavy loads become more wear resistant by inducing a compressive stress in their surface through shot peening. This improves their load bearing capabilities and their fatigue life. Shot peening also allows to make the components smaller and lighter without affecting their performance.

THE SHOT BLASTING GOALS FOR MEDICAL COMPONENTS

Removal of core and molding sand

Shot blasting allows the quick and effective removal of residual sand and ceramic layers, left on the work piece surface by the casting process.

Descaling, de-rusting

Shot blasting completely removes forging scale and oxide layers left over from forging and heat treatment operations.

Cleaning, deburring/deflashing

With the right blast media all kinds of surface imperfections can be eliminated. Even burs and flashes from die-casting operations can be removed fully automatically at low costs.

Removal of coatings, paint stripping

With the right shot blast process all kinds of paint and oxide layers as well as ceramic, plasma, HFVO and thermal barrier coatings can be completely removed without significantly affecting the substrate material.

Creating a mat finish

Shot blasting creates a mat finish on shiny surfaces. For example, the instruments and medical equipment used in operating rooms must have such a finish to prevent glare on metallic surfaces.

Surface texturing

Texturing (roughening) increases the surface area on a work piece. This is required as preparation for painting and gluing operations. Depending on the utilized blast media different roughness values can be achieved on the work piece surface.

WHAT IS 3D POST PROCESSING?

Automated post processing with consistent results and at reasonable costs

THE POST PROCESSING CHALLENGES IN ADDITIVE MANUFACTURING

The treatment of the raw components coming from a 3D printer, the so-called “post processing”, must comply with numerous technical demands such as consistency of results, adaptation to high volume production and cost-efficiency. To date the post processing function was mostly performed by

hand. But this can no longer meet the increasingly tougher industrial requirements. In addition, depending on the utilized 3D print technology, a range of post processing steps must be undertaken to transform the raw part into a functional product:

Cleaning / de-powdering

In conjunction with additive manufacturing the term “cleaning” means the removal of powder that is either loosely adhering or firmly sticking to the surface of the printed component. In addition, the component surface must be homogenized for an even appearance.

Surface refinement

3D printed components usually have a high initial surface roughness with Ra values of up to 50 µm. Depending on the ultimate purpose of the work pieces, their surface must be smoothed and polished to a Ra value of < 0.5 µm.

Support removal

Especially with printing methods like SLA, Poly-Jet, SLM/DMLS, EBM, FDM or Binder Jetting complex and delicate work pieces with overhangs must be printed with so-called “supports.” They stabilize the not yet cured components during the printing operation but must subsequently be removed.



THE PRODUCT PORTFOLIO OF – AM SOLUTIONS 3D POST PROCESSING TECHNOLOGY

The various post processing tasks cannot be performed with one single system. On the contrary, the post processing methods must be precisely adapted to the utilized printing technology and the respective work pieces. Under its brand “AM Solutions

– 3D post processing technology” Rösler offers comprehensive equipment solutions for 3D printed components made from metal and plastic.

THE POST PROCESSING GOALS

- ▶ Unpacking and de-powdering
- ▶ Automatic chemical-mechanical support removal
- ▶ Surface preparation for coating
- ▶ Defined edge radiusing
- ▶ Surface smoothing
- ▶ High gloss polishing
- ▶ Cleaning and smoothing of internal channels
- ▶ Targeted colorization of plastic components printed by laser sintering

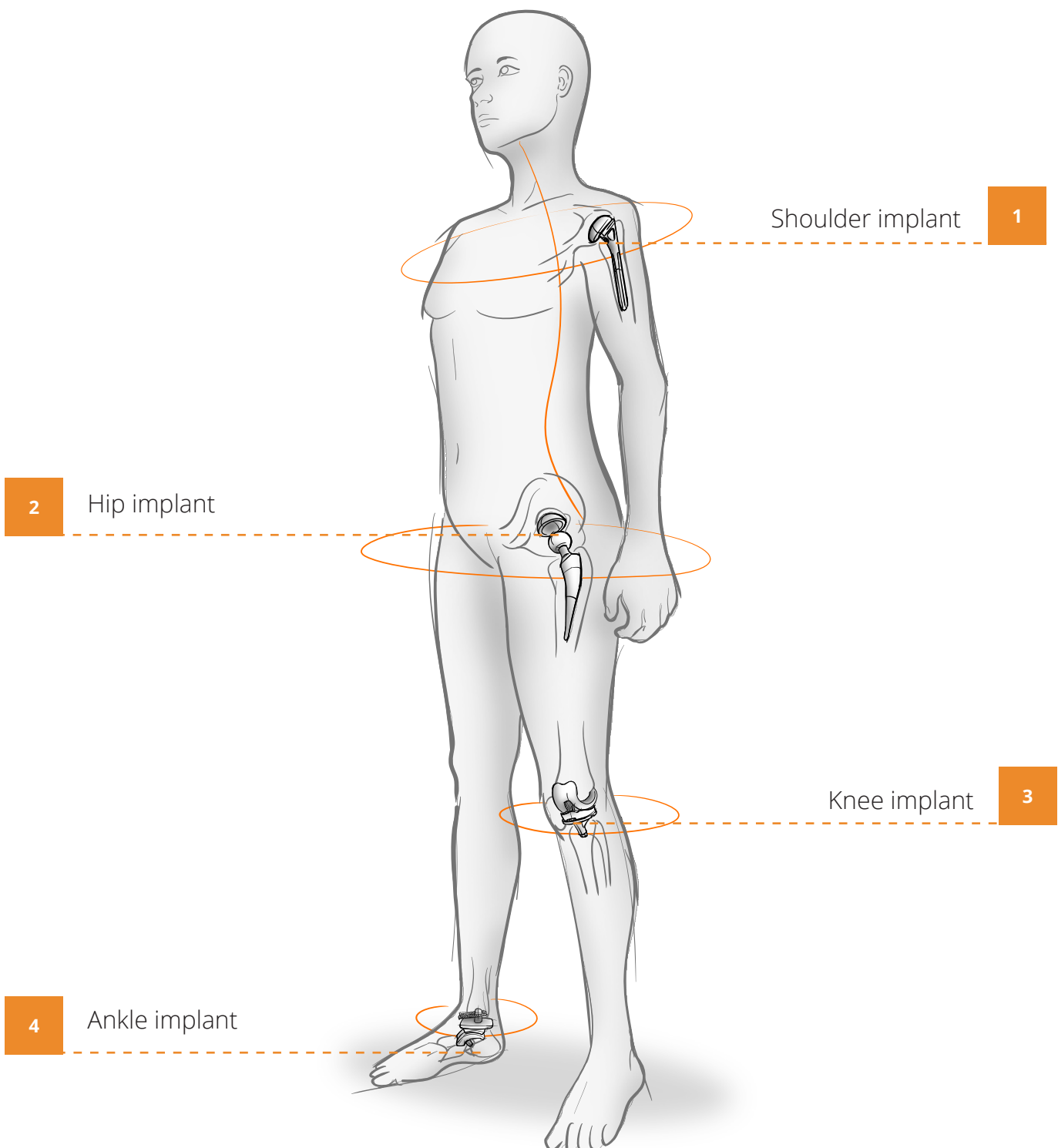
PLEASE NOTE!

It is highly recommended that all post processing aspects are already considered during the design phase for a product. This integrative approach helps prevent costly mistakes. We will gladly support you with our expert knowledge!

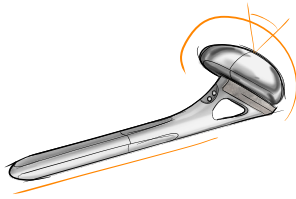
ENDOPROSTHETIC COMPONENTS

Driven by a more active lifestyle and increased life expectancy the components for endoprosthetic reconstruction, i.e. complete or partial joint replacement in the body, are becoming more important. Thanks to new materials and improved surface refinement technologies, knee and hip implants can

perfectly function in the body for over 20 years. When it comes to extending the usable life of implants, surface refinement steps like cleaning, fine grinding, polishing or texturing play a key role.

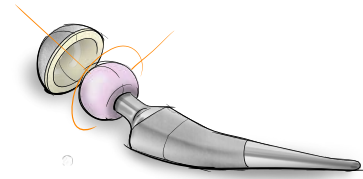


1 Shoulder implant



SURFACE GRINDING, SMOOTHING, POLISHING,
DRY POLISHING, SURFACE TEXTURING, CORE SAND
REMOVAL, UNPACKING

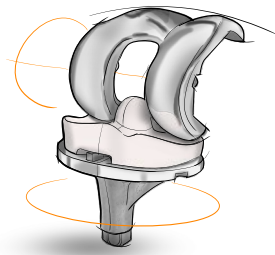
2 Hip implant



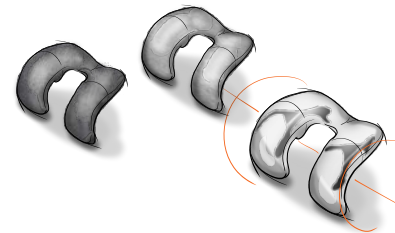
Hip stem and ball, acetabular cup

SURFACE GRINDING, SMOOTHING, POLISHING,
DRY POLISHING, SURFACE TEXTURING, CORE
SAND REMOVAL, UNPACKING, SHOT PEENING

3 Knee implant



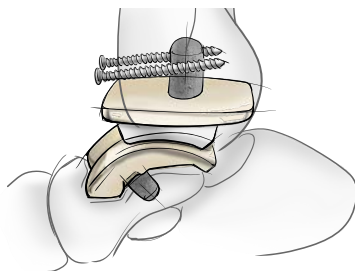
Femoral and tibia



The perfect surface finishing of
knee implants in three steps

SURFACE GRINDING, SMOOTHING, POLISHING, DRY POLISHING, SURFACE TEXTURING,
CORE SAND REMOVAL, UNPACKING

4 Ankle implant

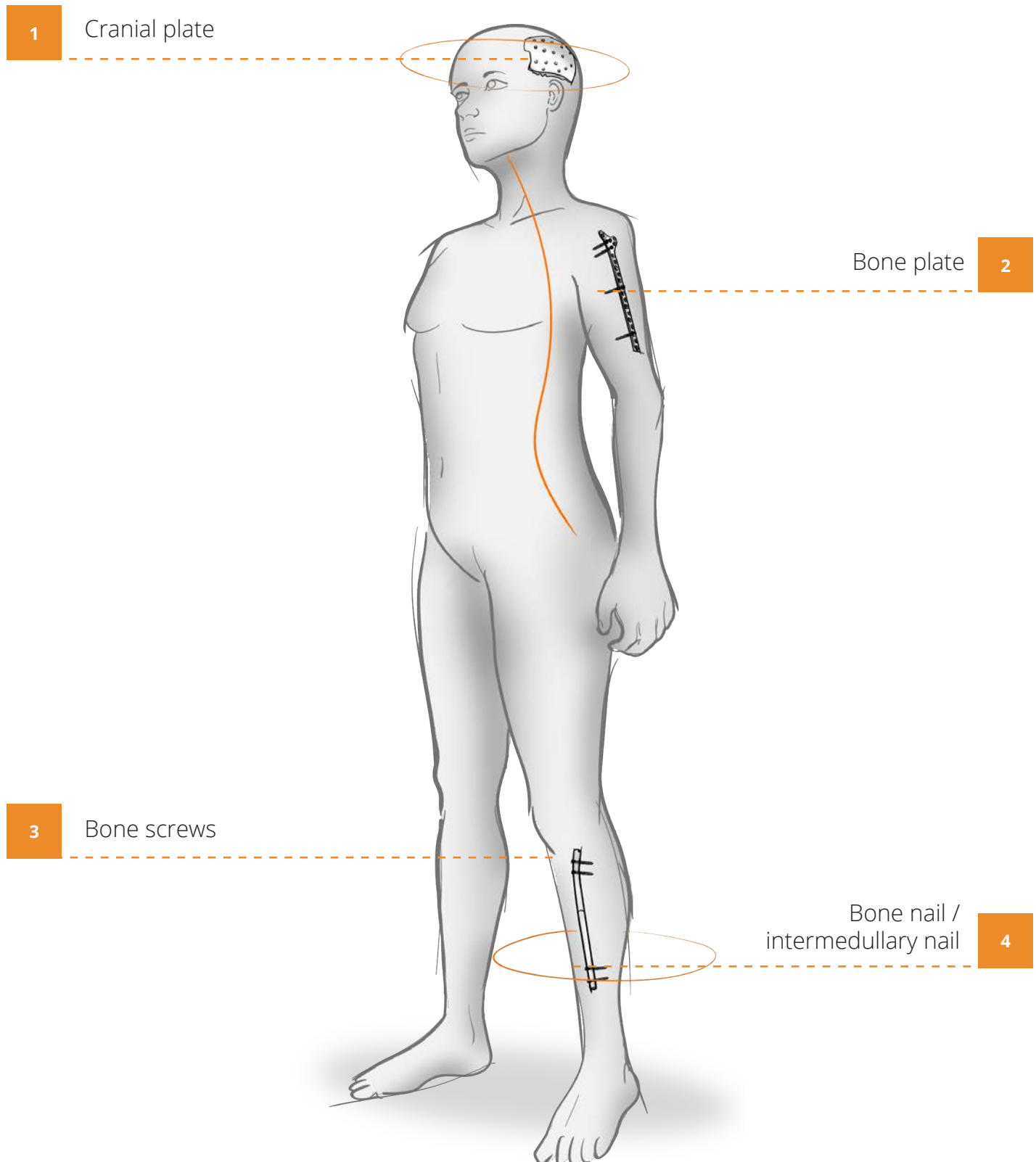


SURFACE GRINDING, SMOOTHING,
POLISHING, DRY POLISHING

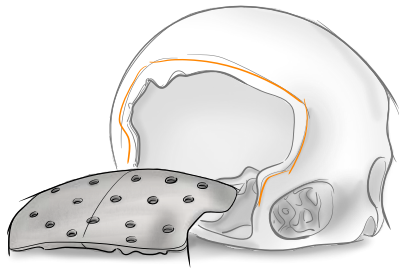
TRAUMA IMPLANTS

Trauma implants are essential for the treatment of bone fractures and other injuries. The surface finish of trauma implants significantly affects their functionality and the healing process in the patient. Therefore, they are subject to strict

manufacturing standards. Preferred finishing methods are deburring, surface grinding, smoothing, polishing and surface texturing.

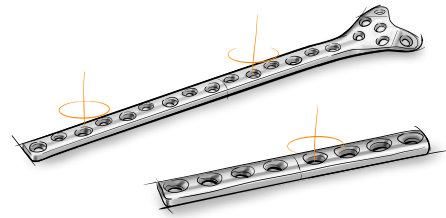


1 Cranial plate



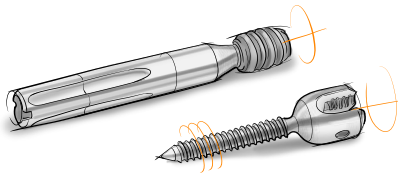
DEBURRING, SURFACE GRINDING,
SMOOTHING, POLISHING, DRY POLISHING

2 Bone plate



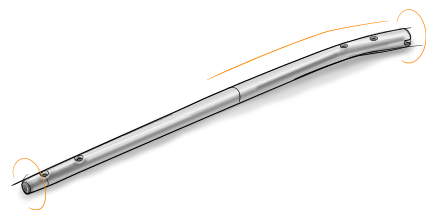
DEBURRING, SURFACE GRINDING,
SMOOTHING, POLISHING

3 Bone screws



DEBURRING, SURFACE SMOOTHING, DRY
POLISHING, SHOT PEENING

4 Bone nail / intermedullary nail

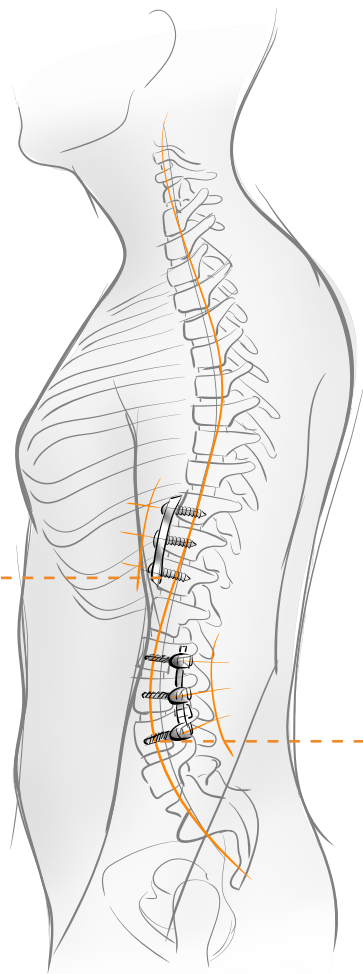


DEBURRING, SURFACE GRINDING,
SMOOTHING, POLISHING

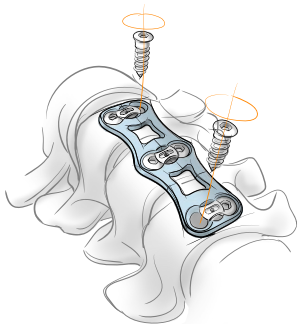
SPINAL IMPLANTS

In everyday life the spine is exposed to many loads. Over time this can result in considerable wear causing damage on disks and other spinal parts. For repairing the damage special spinal implants are necessary. Because of their critical function and

performance requirements these implants must comply with extremely strict quality standards. The most common surface refinement methods for spinal implants are deburring, surface grinding, smoothing, polishing and shot peening.



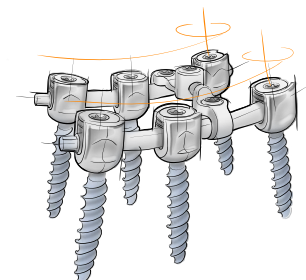
1 Cervical plate system



DEBURRING, SURFACE GRINDING,
SMOOTHING, POLISHING, DRY POLISHING

Pedicle screws for spine fusion systems

2

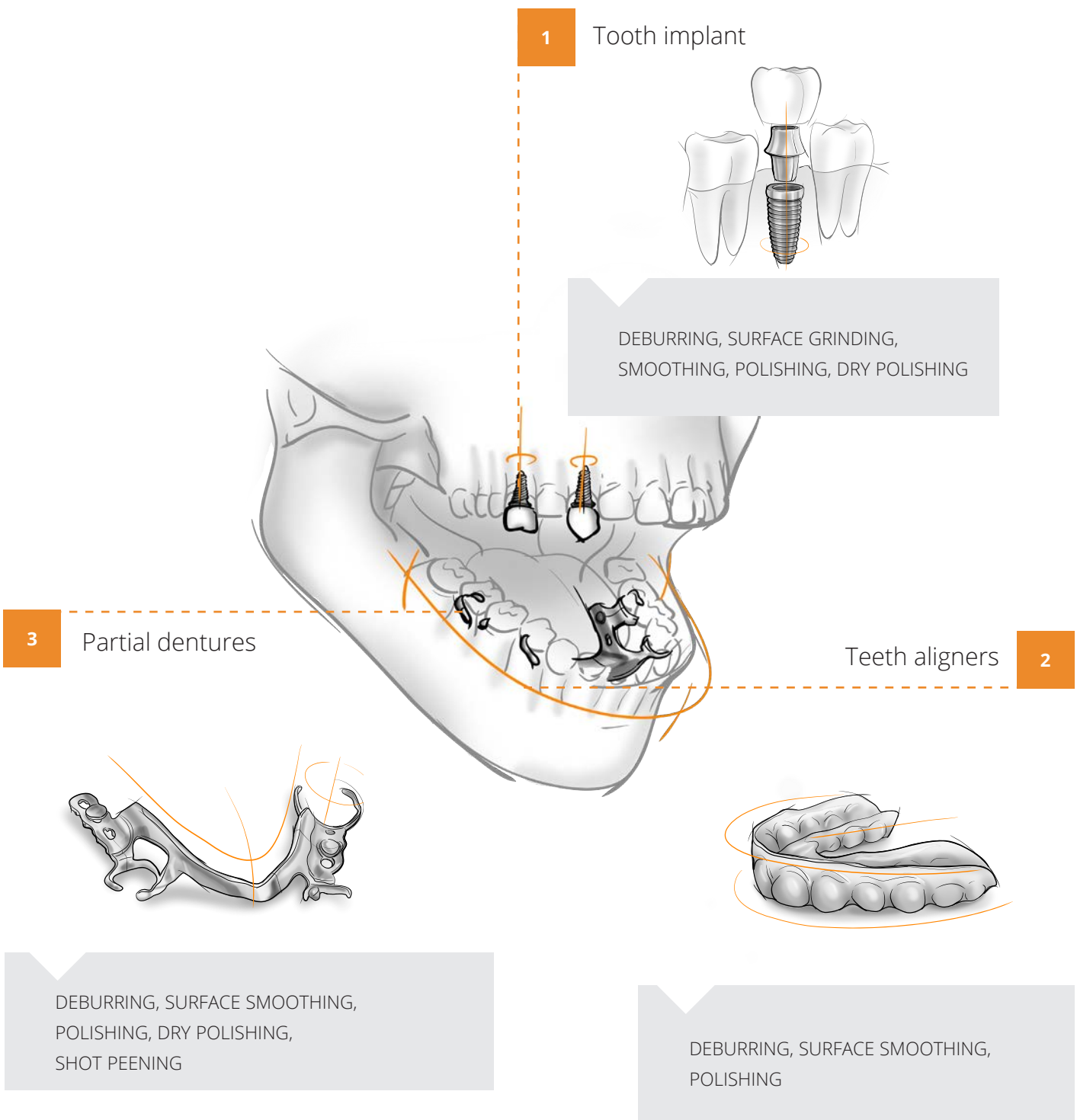


DEBURRING, SURFACE SMOOTHING,
POLISHING, SHOT PEENING

DENTAL TECHNOLOGY

Dental implants and inlays represent the most common solution for replacing missing and repairing existing teeth. Furthermore, modern components such as teeth aligners can relieve or eliminate undue loads on the teeth. Surface

refinement methods like deburring, surface grinding, smoothing and polishing play a key role in extending the usable life of dental implants.

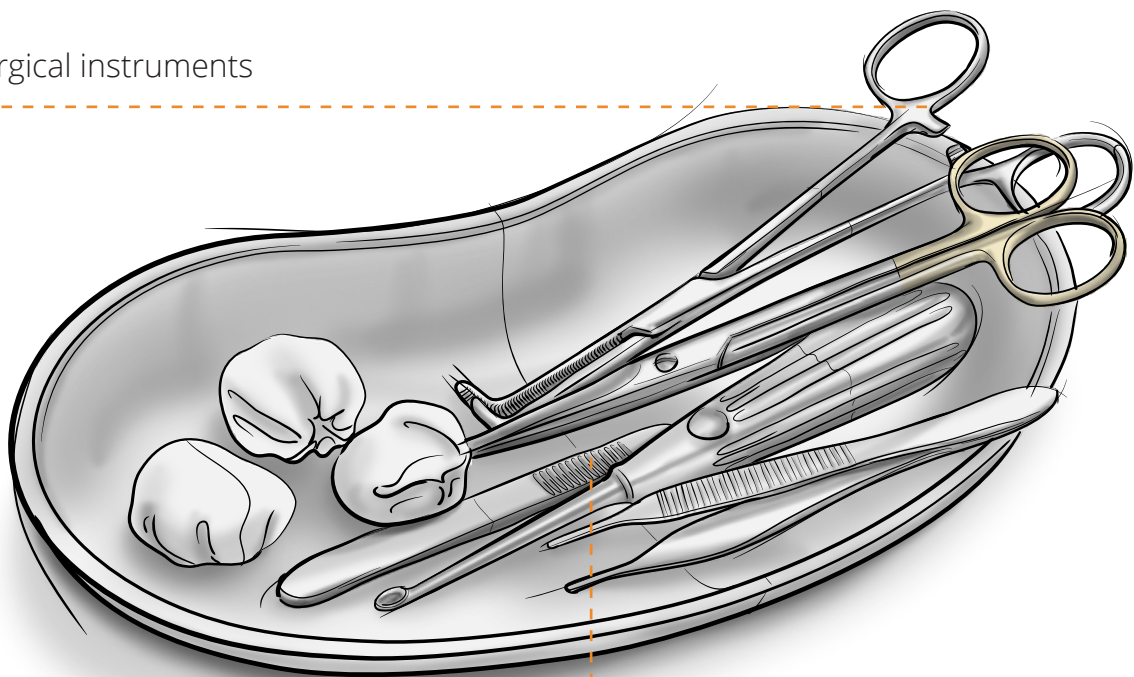


MEDICAL INSTRUMENTS

Considering their critical function, the manufacturing of medical instruments is subject to the highest quality standards. Only high-value surface finishes guarantee the required functionality, high sterility, corrosion resistance and absolute reliability.

Since most medical instruments must have a satin, non-glare finish, the most common surface refinement methods are slight surface texturing (“matting”), shot peening, deburring and surface smoothing.

1 Surgical instruments



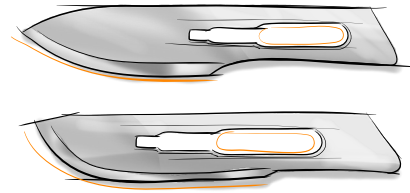
2 Scalpel blades

1 Surgical instruments



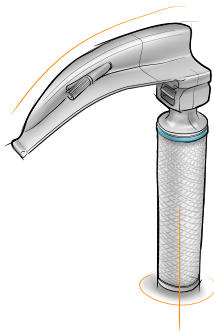
DEBURRING, SURFACE GRINDING, SMOOTHING, POLISHING, DRY POLISHING, APPLYING A SATIN OR MAT FINISH

2 Scalpel blades



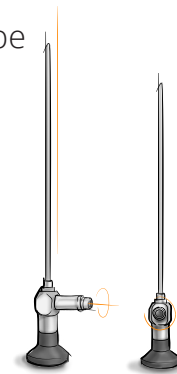
SURFACE SMOOTHING, POLISHING

3 Laryngoscope



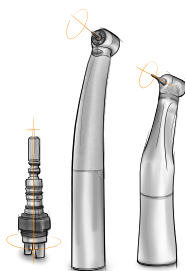
SURFACE SMOOTHING, POLISHING, DRY POLISHING, APPLYING A SATIN OR MAT FINISH

4 Borescope



SURFACE SMOOTHING, POLISHING, SHOT PEENING, APPLYING A SATIN OR MAT FINISH

5 Drill heads

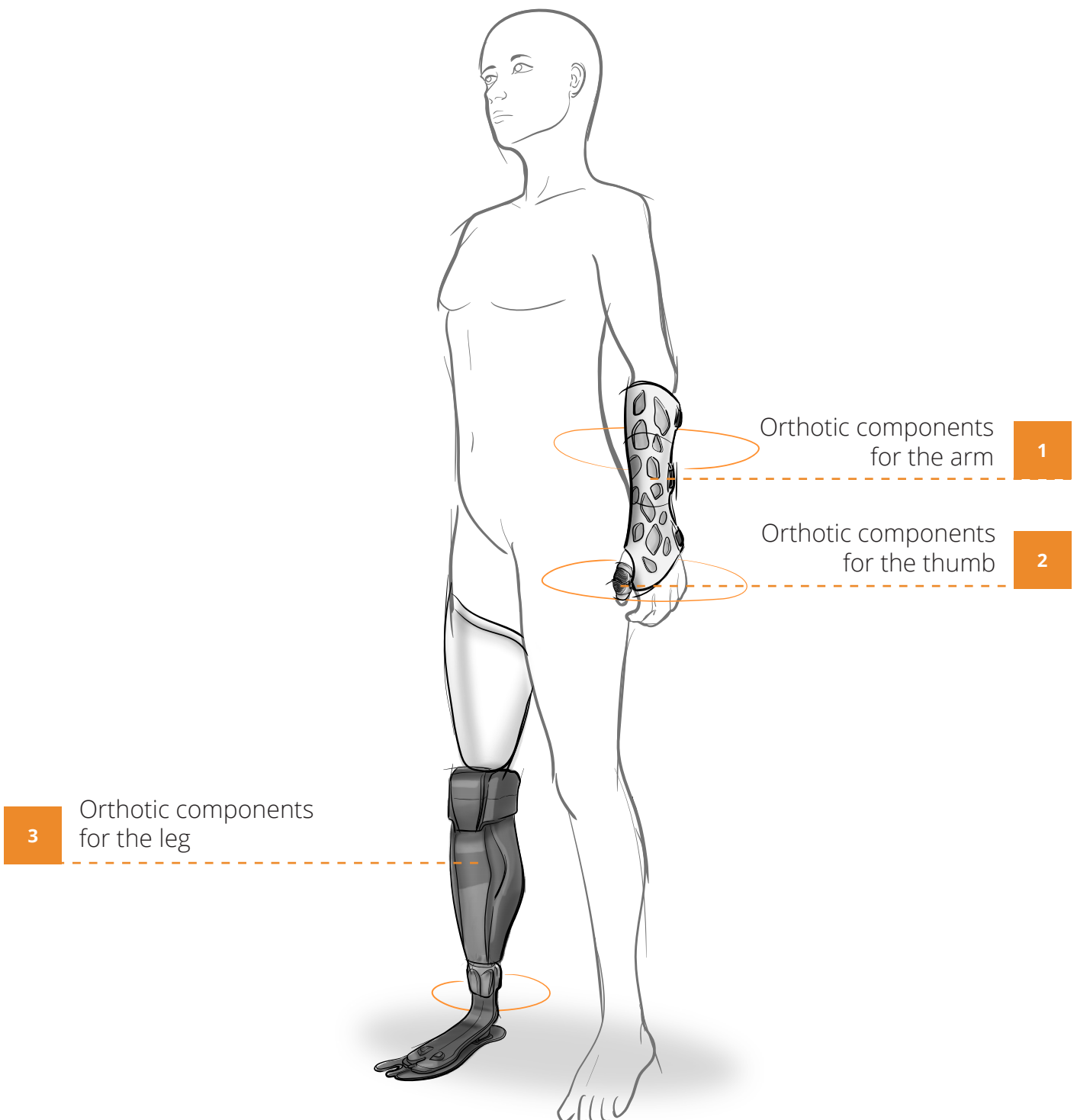


DEBURRING, SURFACE SMOOTHING, POLISHING, APPLYING A SATIN OR MAT FINISH

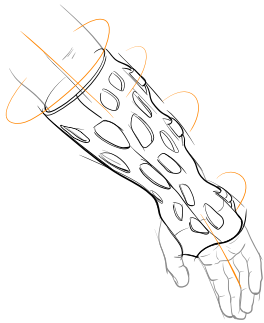
PROTHETIC / ORTHOTIC COMPONENTS

While orthotic components are fitted to support a body part, prosthetic components are practically taking over the function of this part. Different applications require a precisely adapted surface refinement operation. This can include deburring, surface grinding, surface smoothing and polishing.

For 3D printed parts, especially components made from plastic, additional operations such as de-powdering and surface homogenization / peening, are necessary. Special surface refinement methods improve the functionality and extend the usable life of prosthetic and orthotic components.

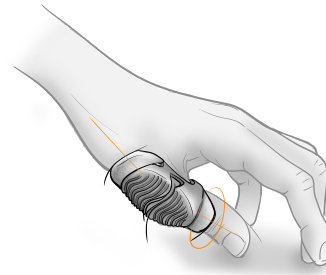


1 Orthotic components for the arm



DEBURRING, SURFACE SMOOTHING, POLISHING,
DE-POWDERING, SURFACE HOMOGENIZATIONEN
AND PEENING

2 Orthotic components for the thumb



DEBURRING, SURFACE SMOOTHING, POLISHING,
DE-POWDERING, SURFACE HOMOGENIZATIONEN
AND PEENING

3 Orthotic components for the leg



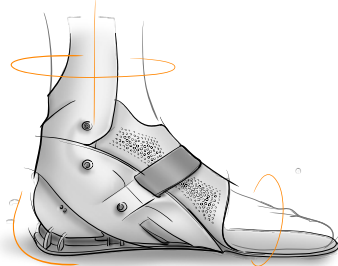
DEBURRING, SURFACE GRINDING, SMOOTHING,
POLISHING, DRY POLISHING, DE-POWDERING
SURFACE HOMOGENIZATION AND PEENING

4 Orthotic components for the knee



DEBURRING, SURFACE SMOOTHING, POLISHING,
DE-POWDERING, SURFACE HOMOGENIZATIONEN
AND PEENING

5 Orthotic components for the foot



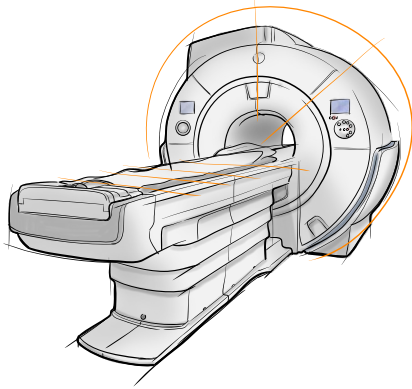
DEBURRING, SURFACE SMOOTHING,
POLISHING, DE-POWDERING, SURFACE
HOMOGENIZATIONEN AND PEENING

COMPONENTS FOR MEDICAL EQUIPMENT

Modern medical equipment is indispensable for diagnostics and the treatment of patients. Therefore, it is extremely important that all components are working without any fault. To a large extent the functionality of the equipment components depends on their surface finish. Moreover, many times anatomical models are utilized to demonstrate and explain specific bodily

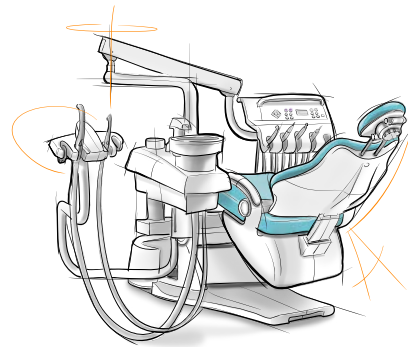
functions. In the field of additive manufacturing, especially in the case of certain plastic components, frequently support structures must be removed. Below we have listed a few medical devices, where the components going into these devices require a deburring, surface smoothing, polishing or shot peening operation.

Components for MRI scanners



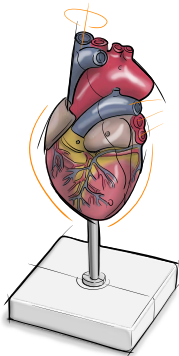
DEBURRING, SURFACE GRINDING,
SMOOTHING, POLISHING,
SURFACE TEXTURING

Components for dentist chairs



DEBURRING, SURFACE GRINDING,
SMOOTHING, POLISHING,
SURFACE TEXTURING

Components for anatomical models



SUPPORT REMOVAL,
SURFACE SMOOTHING

YOU CAN'T FIND YOUR WORK PIECES?

The components shown on the previous pages represent only a small sample of the many surface finishing possibilities for medical components. Irrespective of whether you produce implants, medical instruments, components for medical equipment or other medical components: With over 80 years of experience in the field of surface treatment we will find the right solution for your work

pieces. With our problem-solving approach we always consider your specific demands and requirements for developing a finishing process that is right for you. Our solutions portfolio includes deburring, surface grinding, smoothing, applying a mat finish, surface texturing, cleaning, shot peening and even high gloss polishing.

Please contact us for further information!



MASS FINISHING EQUIPMENT

It does not matter whether you need batch processing of medical instruments or single piece, high-quality finishing of endoprosthetic components. The Rösler mass finishing technology can always offer you an equipment concept that

meets the strictest quality requirements. To ensure the highest operational flexibility, our machines can be easily linked with suitable peripheral equipment and fully automated.

Some of our mass finishing machines

Mass finishing systems for batch processing

Rotary vibrators

The Rösler rotary vibrators are true all-round machines that allow finishing all kinds of work pieces with different shapes and sizes in the exact quantities you produce. A special vibratory motor mounted in the center of the processing bowl induces a precisely calibrated vibration. This causes the work piece/media mix in the processing bowl to make a helical forward motion, whereby the media and work pieces are constantly rubbing against each other. With suitable peripheral equipment for work piece handling and post treatment the rotary vibrators can be upgraded to fully automatic finishing lines.



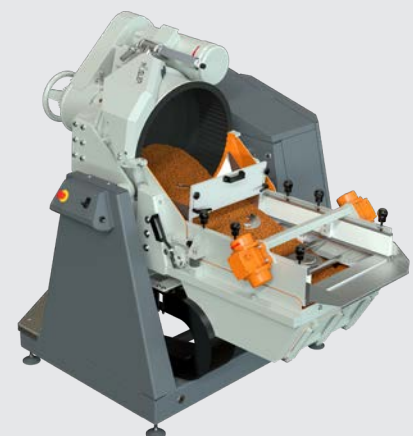
Tub vibrators

In Rösler tub vibrators the same vibratory principle is applied. But tub vibrators have a rectangular processing bowl. Instead of the helical forward movement created in rotary vibrators, the tub vibrators generate a rotary movement of the work piece/media mix in the rectangular bowl. Tub vibrators are compact and powerful machines that are often used for treating single, large work pieces. However, they can also be used for the cost-efficient finishing of small work piece batches.



High energy disk systems

Rösler high energy disk systems are highly productive finishing systems for treating different quantities of work pieces in all kinds of sizes and shapes. They consist of a round stationary processing bowl and a rotary spinner located in the bottom of the bowl. The centrifugal force created by the rotating spinner pushes the mix of media and work pieces up along the wall of the stationary processing bowl. Due to the decreasing acceleration and gravity the media/work piece mix slides back to the spinner, where its again accelerated. Compared to conventional vibratory systems the high energy disk technology is up to 15 times more productive.



Mass finishing systems for processing single work pieces

Rotary vibrators without inner dome

High-value, delicate medical components must not touch each other during the finishing process. Therefore, they must be processed as single pieces. This is achieved by mounting individual work pieces to a holding device, which in turn is attached to the processing bowl. Since these special vibrators do not have an inner dome, one large or several smaller work pieces can be finished in one cycle. During the process the media is flowing around the mounted work pieces. This ensures that intricate inner surface areas are also finished.



Drag finishers

The drag finishing technology is ideal for treating high-value, delicate work pieces with complex shapes, for example, endoprosthesis components. Individually attached to special work piece holders, the work pieces are mounted to rotary work stations / spindles and "dragged" through a stationary processing bowl filled with grinding or polishing media. This allows a highly precise, targeted finishing operation. Compared to conventional vibratory systems drag finishers are up to 30 times more productive.



Surf-finisher and multi-surf-finisher

Surf finishing is also a technology, where the work pieces do not touch each other during the finishing operation. The work pieces are individually attached to working spindles or held by a gripper integrated into the arm of a robot. During the finishing process they are immersed into a rotating processing bowl filled with grinding or polishing media. Whereas in surf finishing systems with working spindles the movement of the work pieces is somewhat limited, the robot-guided surf finishing technology offers unlimited work piece motions. The rotation of the processing bowl with a speed of up to 170 RPM results in an extremely intensive process.



Depending on the selected process and respective media and compounds, all mass finishing tasks can be performed in our equipment. We will gladly assist you in choosing the solution that is right for your finishing application!



SHOT BLASTING EQUIPMENT

From manual blast cabinets to fully automatic, interlinked systems, the Rösler shot blasting technology will offer you a solution for any surface refinement task. We supply custom-engineered equipment designs, process monitoring, automatic

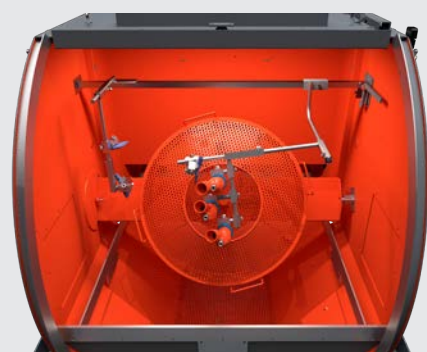
process controls and offline programming. Whether you choose a wet or dry shot blasting system or high-pressure water jet blasting, we can offer you the right solution – everything from one single source.

Some of our shot blasting machines

Shot blasting machines for batch processing

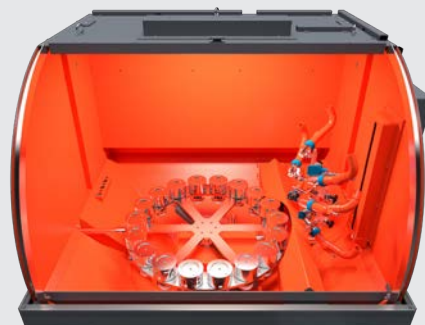
Blast systems with rotary basket

Blast cabinets with integrated rotary basket are ideal for batch processing of small and midsize components. Even exceedingly small work pieces can be consistently finished at low costs. Depending on the shot blasting task suction (injection) or pressure blast systems can be utilized. An entire work piece batch is loaded into the basket that rotates during the finishing process. This ensures uniform shot blasting results. Rotary basket blast systems are especially suited for processing many different work piece types in small batches. Work piece changes require no retooling.



Satellite table blast systems

Rösler satellite table blast machines are used for processing delicate work pieces, which cannot touch each other during the shot blasting operation. The individual satellite stations are equipped with special work piece holders, which, if needed, are masking those surface areas on the work pieces that must not be blasted. After the work pieces have been placed on the satellite stations, the process is running fully automatically. In case of different work piece sizes an automatic blast nozzle movement can be integrated.



Depending on the selected process and the suitable blast media, all shot blasting tasks can be performed in our equipment. We will gladly assist you in choosing the solution that is right for your finishing application!



Shot blasting systems for processing single work pieces

Manual blast cabinets (dry blasting)

Rösler manual blast cabinets are predominantly used for treating a variety of different work pieces in small volumes, irrespective of how complex the work pieces may be. With their high quality and dust-proof design our cabinets are ideal for industrial applications. With many options and accessories they can be perfectly adapted to your specific shot blasting requirements.



Manual blast cabinets (wet blasting)

Our wet blasting cabinets allow a broad range of different applications. Compared to dry shot blasting in wet blast systems a mix of water and blast media is accelerated by a slurry pump and compressed air and thrown at the work piece surface. Wet blasting is very gentle and produces excellent, fine finishes. Another benefit is that the slurry of water and blast media does not generate any dust.



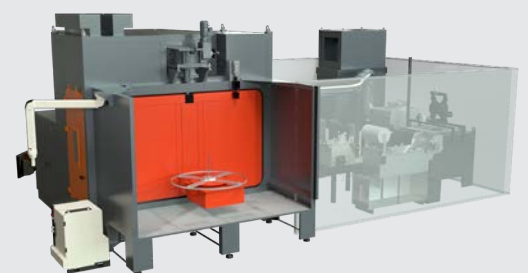
Automated shot blast machines and custom-engineered systems

Our equipment portfolio ranges from manual blast cabinets to fully automated systems. These include robot-guided blast nozzles, automatic work piece handling, gripper design for robots, implementation of work piece staging systems, automatic tool change and many more. Rösler is your partner for custom-engineered shot blasting solutions.



High pressure water jet blasting

This shot blast technology is ideal for the removal of ceramic residues from investment castings or the unpacking of entire casting trees. Rösler high pressure water jet blasting systems are available in manual as well as fully automatic versions. They are utilized for technically demanding castings as well as for paint and coating stripping and general cleaning. A major benefit of the high-pressure water jet blasting is its intensity paired with a gentle treatment of the work piece surface. For example, it allows the complete removal of ceramic residue from investment castings without mechanically or thermally affecting the material.



EQUIPMENT PORTFOLIO **AM SOLUTIONS**

Post processing of 3D printed components

Like in other industries the post processing tasks for medical components extend to the removal of loose or sintered powder from the work pieces and surface refinement. This can include

deburring, precisely defined edge radiusing, surface smoothing and, frequently, high gloss polishing.

Some of our AM Solutions equipment

S3 Duo – Automatic de-powdering and initial surface smoothing of 3D printed components

Today powder-bed based 3D printing methods are utilized to produce implants, such as artificial spinal disks or interbody fusion cages made from high-value plastic or metal (PEEK / titanium). After they have been printed, the components have an extremely rough surface and are contaminated with loose and sintered powder. This powder must be removed, and an initial surface smoothing operation must be performed. The wet blasting system S3 Duo represents the ideal solution for such tasks. This fully automated, robotic system allows a highly intensive but, at the same time, gentle processing. It removes not only residual powder and other contaminants but, depending on the utilized blast media, can also achieve an initial smoothing of the component surface. This initial smoothing effect greatly facilitates subsequent surface refinement operations, for example in the vibratory finishing system “M”.



M3 – surface smoothing and high gloss polishing of implants and surgical instruments

Certain surface areas on hip and knee implants must remain rough, whereas others require a high gloss finish with extremely low Ra values. Such finishes with Ra values of $< 0.1 \mu\text{m}$ can be reliably achieved in the M3 system. The work pieces are individually mounted in the machine so that they cannot touch and damage each other during the finishing operation. By using different types of media, several finishing stages like surface grinding, smoothing and polishing can be run in the same machine. The M3 also allows the finishing of inner contours, even tight internal passages. A comprehensive sensor and automation package, including the monitoring of the imbalance settings and other parameters such as automatic media replenishment and media unloading is part of the M3 design. Implants, surgical instruments and many other medical components can be processed in the M3.



S1 – De-powdering and shot peening in one blast system

Medical components produced with powder-bed based printing systems, such as orthotic components, must be de-powdered and cleaned after the printing operation. Small work piece batches can be quickly processed in the S1 blast cabinet. This compact and smart machine can be easily operated and, thanks to state-of-the-art soft & hardware, guarantees absolutely consistent results. Compliance with ATEX standards, a highly efficient blast media recycling and cleaning system and excellent wear protection are part of the overall machine design. The S1 from AM Solutions is also ideal for shot peening. This operation extends the service life of metallic components, for example, implants and orthotic components, which are exposed to high tensile and bending stresses. In case of colored or non-colored polymer components the peening or homogenization shot blasting with spherical media generates the final surface finish. This process is increasingly utilized in the production of orthotic and prothetic components.



A novelty for the MJF print technology: Innovative, fully automated 3D unpacking station, developed in cooperation with HP

The 3D automatic unpacking station, jointly developed with HP, allows the fully automated de-powdering of components printed with the Multi Jet Fusion (MJF) system: After the cooling down phase the entire work piece batch is transferred to the 3D unpacking station. With the specially developed unpacking process the powder residues are then suctioned off and collected in a container.

The new system allows linking the printing and the unpacking operation for a fully automated process. This increases the overall productivity, lowers costs and guarantees a higher process stability. Moreover, the new system also achieves a significantly higher powder recycling rate!



Depending on the selected process and associated blast media, practically all shot blasting tasks can be performed in our equipment. We will gladly assist you in choosing the solution that is right for your finishing application!

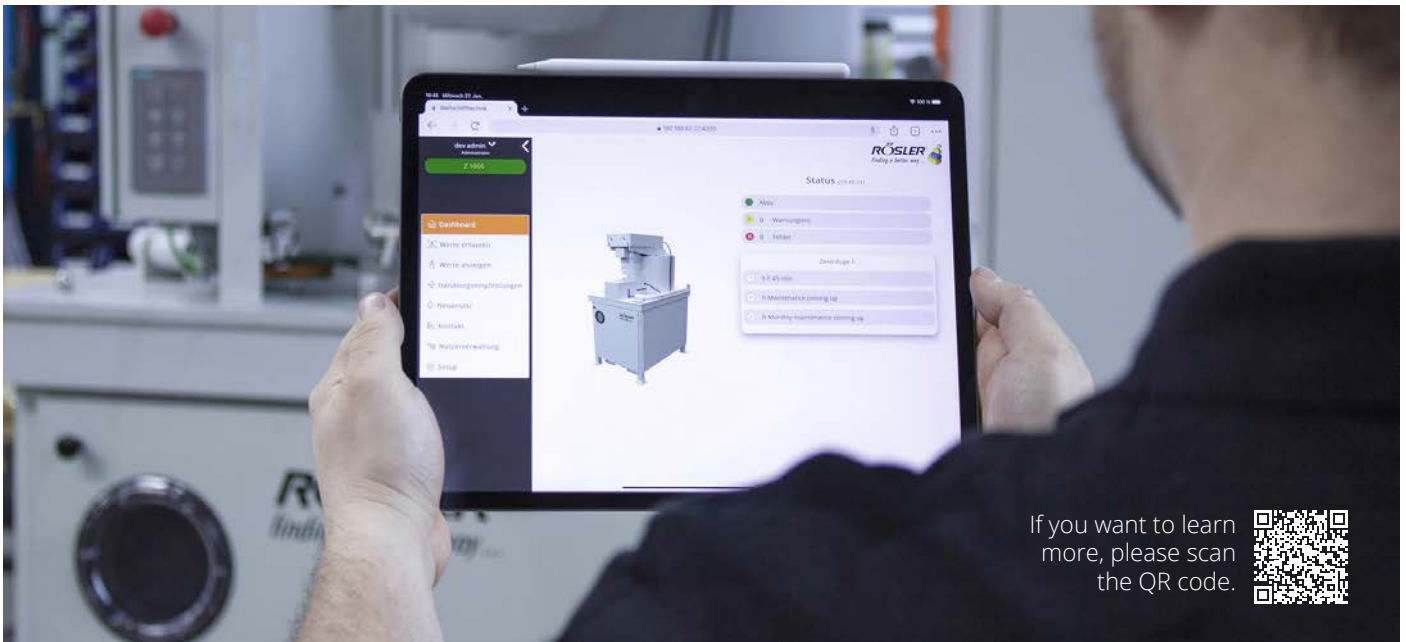


RÖSLER SMART SOLUTIONS

A digital added value to meet your challenges

Now is the time to promote the **digital transformation** and develop innovative digitization solutions. Under our new brand **Rösler Smart Solutions** we have developed a comprehensive digitization product that will allow you to **make processes**

and their parameters more transparent and to define the potential for substantial cost savings. Our package creates the **potential for optimization significant reduction of the operating costs.**



If you want to learn more, please scan the QR code.



Transparency of processes and costs



Process monitoring and recording of data



Quick correction of deviations and faults



Intelligent operation with uptime projections



Optimized utilization of resources and cost reduction

MEDIA AND COMPOUNDS

In addition to our machine program, we also offer the most comprehensive range of media and compounds in the world. All our consumable products have been developed and produced in-house with „Made in Germany“ quality. With over 80 years of

experience in the field of surface finishing we can provide our customers with tailormade processes for new applications and solutions for product improvement and cost reductions.

Stable and repeatable finishing processes are our specialty.



The world's largest range of media and compounds

With around 15,000 products our portfolio of consumables is the largest in the world. It includes ceramic and plastic grinding and polishing media, compounds and process water cleaners. All our consumables can be individually adapted to the needs and requests of our customers.



Our ceramic media production

Quality

Our production complies with the most stringent environmental standards and is subject to strict quality controls per DIN EN ISO 9001 and 50001.

Excellent product availability

Our central warehouse in Germany stocks more than 8,000 tons of media and compounds. In addition, our global network of branches and many of our channel partners maintain warehouses with consumables close to our customers.

CUSTOMER EXPERIENCE CENTER

A major strength of the Rösler business approach is that **we look at all aspects of a finishing task**. The equipment and the processes are individually tailored to the respective finishing requirements, but also to their optimal integration into the customer's manufacturing operation. Most of the Rösler sales

branches have their own **Customer Experience Centers (CEC)**, equipped with the latest finishing equipment.

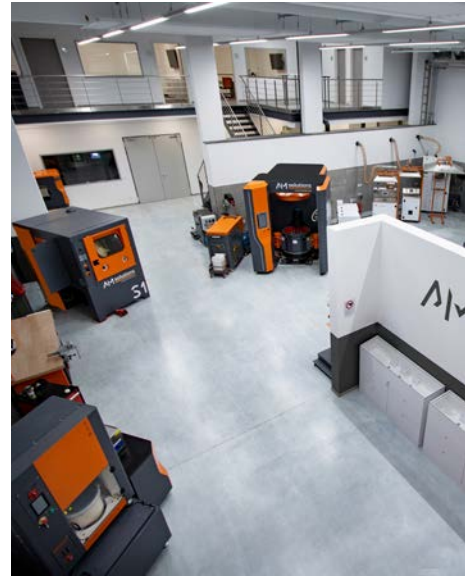
To investigate the various finishing possibilities, in our CEC we are conducting **processing trials** with the work pieces of our respective customers.



CEC Mass Finishing



CEC Shot Blasting



CEC AM Solutions

Process development and process optimization

Our all-around approach guarantees perfect finishing solutions. This includes processing trials, process development, selection of the right machinery and a professional after sales service.

In our CEC, equipped with ultra-modern equipment, we can run practically any mass finishing process.

State-of-the-art **physical and chemical measuring** equipment represents a vital tool for process development and optimization.

The entire focus of our specialists in the engineering and R & D departments is on developing **tailormade finishing solutions**.

Product development and optimization

The enormous depth of the Rösler product range, **CEC around the world** and our well-equipped laboratory at the Untermerzbach location in Germany are an excellent basis for the development of innovative and cost-efficient products in the field of mass finishing.

All our products, be it consumables, finishing equipment,

vibratory motors, process water cleaning centrifuges, as well as work piece handling systems and post processing equipment like dryers, are **developed and manufactured** in-house. Such a high manufacturing depth is unparalleled in our industry.

LEARNING FROM THE GLOBAL LEADER

Our comprehensive mass finishing know-how is founded on over 80 years of experience. As the global technology and market leader in the field of surface treatment we can offer proven

solutions ranging from a broad equipment and consumables portfolio to round-the-clock after-sales service. In our training seminars we are passing our extensive knowledge on to you.



Rösler Academy

The central training center of the Rösler Oberflächentechnik GmbH

- ▶ An area of more than 1,350 m² for learning and working
- ▶ Equipped with the latest digital media and communication technologies
- ▶ Certified professional trainers
- ▶ Specialized fields: Mass finishing, shot blasting, lean management
- ▶ More than 10 different training seminars
- ▶ Focus on hands-on learning
- ▶ Training seminars in German and English
- ▶ Customized training seminars at customer locations upon request

Our professional trainers


All our trainers are certified and are among the best in their respective fields. In our training seminars you will benefit from the extensive experience of our trainers, who will provide you with first-hand practical knowledge.

Ø Participants per year




Over 1,000

Ø Rating



9.6 out of 10 possible points¹

Ø Recommendation rate



99 %¹

¹ Source: Evaluation questionnaires filled out by participants, Status 31/12/2022

You can find more information about our seminars, dates and registration procedures under www.rosler-academy.com or scan the QR-Code.



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