

Mass Finishing

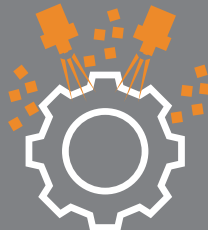


Mass Finishing



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, including 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 mix of media and work pieces, embedded in the work bowl of the machine, is accelerated by vibration, rotation or centrifugal force. This causes the constant “rubbing” of the media against the work pieces resulting in bur removal, surface smoothing and

even polishing. The specific equipment utilized for the process, its duration and the type of processing media and compound determines the finishing results.



Mass finishing can be used for **work pieces made from a variety of materials**

metal | plastic | wood | real and artificial stone | glass | ceramic | rubber

Mass finishing methods are used for **work pieces in practically all manufacturing processes**

Die-casting/injection molding | press forming | cutting | stamping/blanking | embossing | laser cutting | casting | additive manufacturing/3D printing | steel sheets and beams | production tools | etc.

Components after heat treatment: Annealing, hardening | drawing, embossing | forging | roll forming

also after machining: Turning, milling | grinding | electrical discharge machining | bending | laser sintering | powdered metal sintering | fine blanking | etc.

CUSTOMER EXPERIENCE CENTER

MASS FINISHING

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.



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 Untermerzsbach 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.

MASS FINISHING GUARANTEES

process stability, cost efficiency and a clean environment



Deburring

All kinds of burrs on outer contours, as well as in drilled and blind holes, can be minimized or completely removed in a cost effective manner by the right machine and media selection.



Cleaning, de-oiling, degreasing

Contaminations on the work piece surface like lubricants or other pollutants must be removed to allow trouble-free downstream production operations:

- ▶ Cleaning of small mass-produced parts: Part-on-part processing
- ▶ Combined treatment methods: Simultaneous cleaning, deburring and/or edge breaking



Descaling, pickling

Safe, economic and environmentally friendly removal of scale (oxide layers) from the surface of heat-treated parts with mechanical/chemical pickling methods.



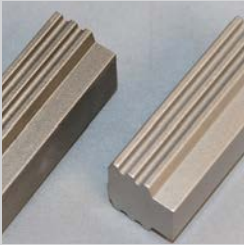
Smoothing, brightening, polishing, RÖSLER Keramo-Finish®

Work pieces from various industries, such as, medical engineering (implants, surgical instruments, etc.), bearings, aerospace turbine components and transmission components, usually require very smooth functional surface finishes or an attractive decorative appearance with very low surface roughness readings ($R_a < 0.015 \mu\text{m}$, $R_z < 0.15 \mu\text{m}$, $R_k < 0.035 \mu\text{m}$). All these methods do not require acidic compounds.



Ball burnishing, pressure deburring, vibro-peening

Polishing media made from steel/stainless steel exert a high pressure on the work pieces.



Edge radiusing

Rounded edges, sometimes with defined radii, are frequently required to ensure the functionality in assembly operations: Edge radiusing is possible with batch operation with relatively short processing times of a few minutes, or continuous feed operation.



Surface grinding

Elimination of surface flaws, a uniform appearance and the reduction of surface roughness are the ideal pre-conditions for surface coating and plating. Even work pieces with complex shapes made from all kinds of material can be successfully processed.



Chemically accelerated mass finishing (ISF®-REM)

Chemically accelerated mass finishing systems utilizing low pH compounds produce very smooth finishes (for example, $R_a < 0.02 \mu\text{m}$, $R_z < 0.14 \mu\text{m}$) on work pieces made from steel.



Antiquing

Surface finishes that look "antique", jagged edges and smooth finishes are adding value to natural stones like marble, granite, etc. The finishing process brings out natural material characteristics.



Surface finishing of small wooden work pieces

Wooden toys and decorative pieces (for example, made from hard wood) are deburred, their edges rounded and painted. Surface smoothing and the application of paint on different work pieces are achieved with special finishing technologies.

ROTARY VIBRATOR

the universal mass finishing system

The most commonly used machine in mass finishing is the rotary vibrator. This machine type can be used for many applications, has been used thousands of times and offers proven engineering down to the last detail. Either employed as a stand-alone machine

or linked with handling systems like work piece loaders and post-treatment equipment (e.g. dryers), rotary vibrators can be quickly developed into fully automatic mass finishing centers.



Rotary vibrator linked with spray washing station, rotary dryer and rotary buffer/storage table



ROTARY VIBRATOR „DL“ UND FBA TURBO/2 - TURBO/2A

mass finishing of delicate work pieces that must not touch each other

In these systems the work pieces are mounted directly to the vibrating work bowl or to special fixtures to prevent part-on-part contact. (FBA Turbo/2A: With mechanical lifting device). The ideal machine for complex finishing tasks on components with complex shapes:

- ▶ Smoothing of pump impellers
- ▶ Smoothing of blisks (aerospace)
- ▶ High gloss polishing of car and truck wheels made from aluminum
- ▶ Smoothing and polishing of orthopedic implants (Hip joints, knee femorals, etc.)

Rotary vibrator „DL“



Special rotary vibrator FBA Turbo/2



COMBINED WASHING/ DRYING SYSTEM WTA

With suitable work pieces (shape, size, fragility) deburring, grinding, polishing, edge radiusing, etc. can also take place without media. The fully automatic system combines the wet finishing process with drying of the work pieces.



LONG RADIUS VIBRATOR

the long processing channel allows batch as well as continuous operation

Because of its compact design and relatively long processing channel the "Long Radius" machine is ideal for directly linking the mass finishing function to manufacturing cells. The continuously arriving work pieces are finished (deburring, edge radi-

using, cleaning, etc.) in one pass through the machine in cycle times of up to 16 minutes. This simplifies logistics and reduces inventories. Of course, Long Radius machines can also be used for special finishing tasks in "batch" mode.



Long Radius linked with spray washing station and hot air belt dryer

ROTOMATIC

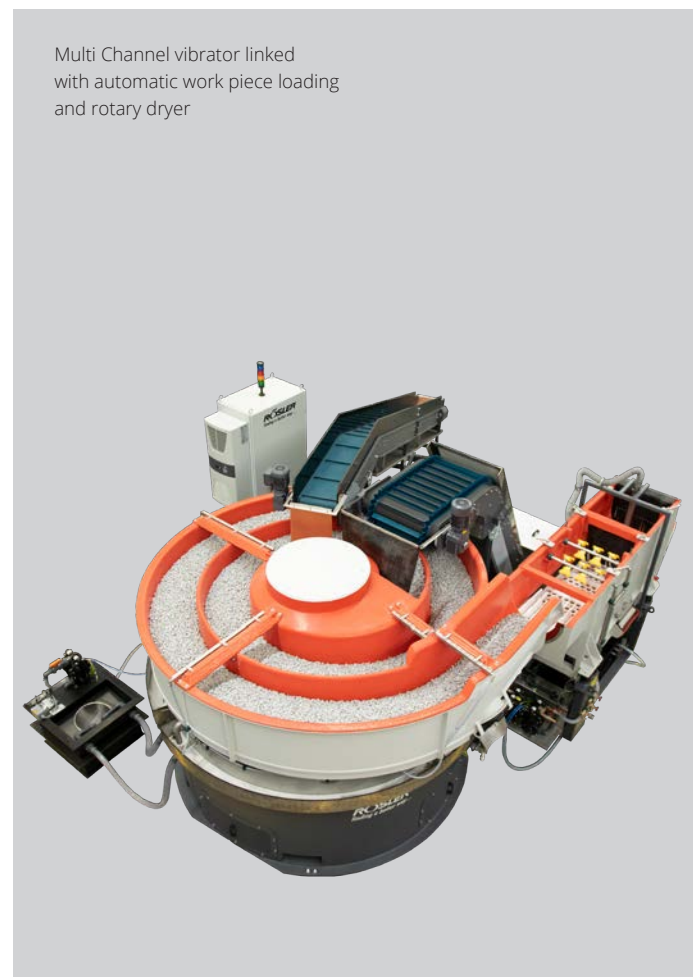
continuous feed system
with spiral processing channel

Multi Channel vibrators are ideal for continuous work piece processing. Frequently, they are directly linked to presses or machining centers.

Ideal for:

- ▶ Processing of delicate work pieces with a significant safety distance to each other to prevent mutual nicking, or
- ▶ For bulk processing of high volumes of mass-produced parts.

Processing channel lengths of up to 27 m (90 ft.) allow processing times of up to 30 minutes.



Multi Channel vibrator linked
with automatic work piece loading
and rotary dryer

TUB VIBRATOR

for large and heavy work pieces

Tub vibrators allow the processing of large, heavy and bulky work pieces. Delicate work pieces can be mounted on work piece fixtures or processed in individual processing chambers created by dividers. This prevents any part-on-part contact. Greatly varying

finishing tasks and work piece dimensions demand a wide spectrum of different machine sizes. Rösler offers machines with usable channel widths of up to 1,600 mm (63") and lengths of 9,000 mm (30 ft.).



Extra long tub: Length of processing channel = 7,400 mm (25 ft.)



Tub vibrator with external media classification



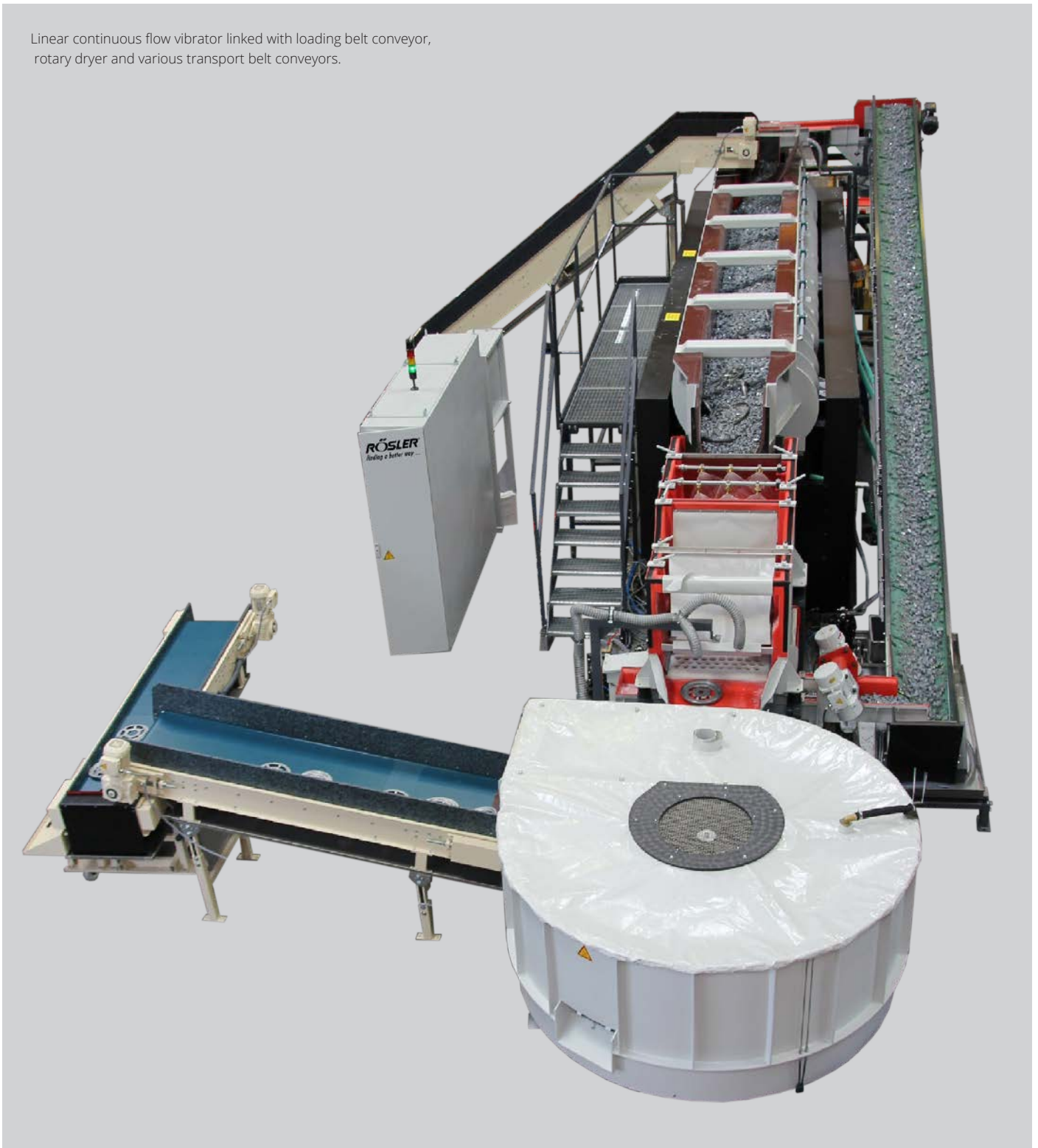
LINEAR CONTINUOUS FLOW VIBRATOR

automatic mass finishing

Continuous feed finishing with linear vibrators increases the throughput of mass-produced small parts as well as larger, somewhat delicate work pieces. These machines can be directly connected to manufacturing cells, like presses or equipped with

automatic work piece loading equipment. When linked to post-treatment systems, like washing and drying, they offer a high degree of automation requiring very little operator involvement.

Linear continuous flow vibrator linked with loading belt conveyor, rotary dryer and various transport belt conveyors.



DRAG FINISHER

mass finishing of high value components without part-on-part contact

Drag finishing technology allows the finishing of midsize work pieces without any part-on-part contact. Mounted to special fixtures the work pieces are "dragged" through a bed of stationary media. Overlapping rotational movements of the work pieces ensure an all-around exposure to the media. The high rotational

speed with the resulting high pressure of media against work pieces allows a high metal removal rate with relatively short processing times. Applications include, deburring, surface grinding & smoothing and high gloss polishing.

2 drag finishers with robotic loading/unloading of the work pieces



Robot attaching a work piece to a workstation in the drag finisher



PLUNGE FINISHER

finishing of rotationally symmetric large components

The plunge finishing technology allows the finishing of single, somewhat larger work pieces with diameters of up to 600 mm (24"). A rotating spindle – sometimes with an eccentric or

reciprocal movement - moves the work piece through the grinding or polishing medium.



SURF-FINISHER

for finishing of targeted surface areas on a work piece

Surf finishing technology also allows for the treatment of work pieces without any part-on-part contact. Multiple spindles, each holding one work piece, or a robot holding the work piece with a clamping device, immerse the work pieces into the rotating processing medium. While the design with multiple spindles limits

the work piece movement in the media, the robot-based technology with its nearly unlimited work piece manipulation possibilities allows tackling practically any finishing task irrespective of how complicated it might be.

Surf-Finish center with 2 robotic work stations and a roller conveyor system for staging of the work pieces



Compact Surf-Finisher



Glimpse into the rotating work bowl:
Robot-guided work piece



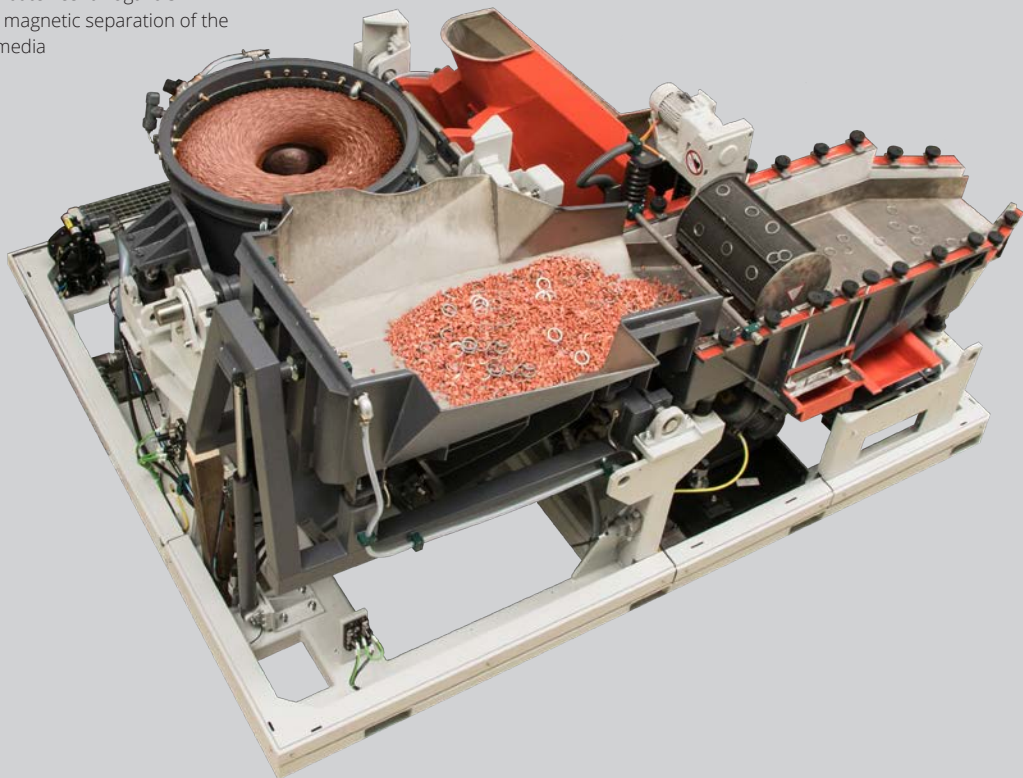
CENTRIFUGAL DISK FINISHING MACHINE

high performance finishing of mass produced parts

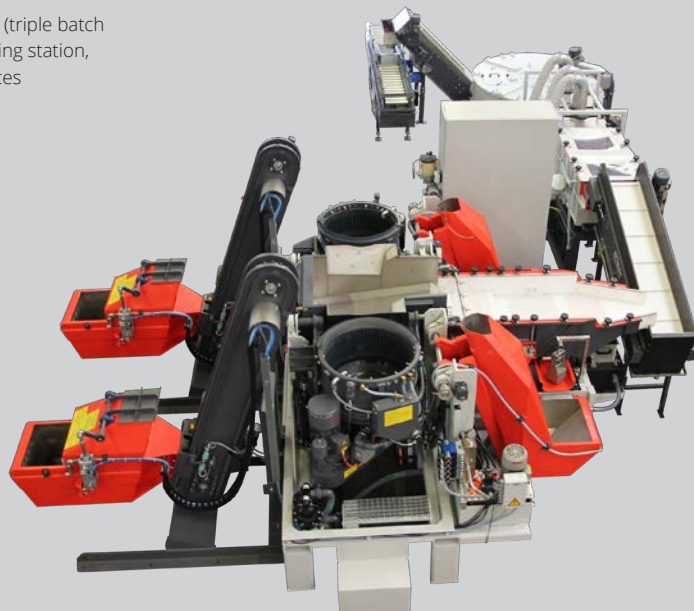
Compared to other mass finishing systems centrifugal disk machines offer a 15 – 20 times higher processing intensity. This results in short processing times and maximum throughput rates. Fully automatic double batch systems or semi-automatic

compact units can be individually tailored to any finishing task. The processing possibilities reach from extremely thin parts like springs and washers to substantial work pieces like gear components.

Fully automatic double batch centrifugal disk finishing machine with magnetic separation of the work pieces from the media



Fully automatic tandem centrifugal disk finishing machine (triple batch system) with work piece loading, spray washing & pre-drying station, rotary dryer and staging system for the finished work pieces



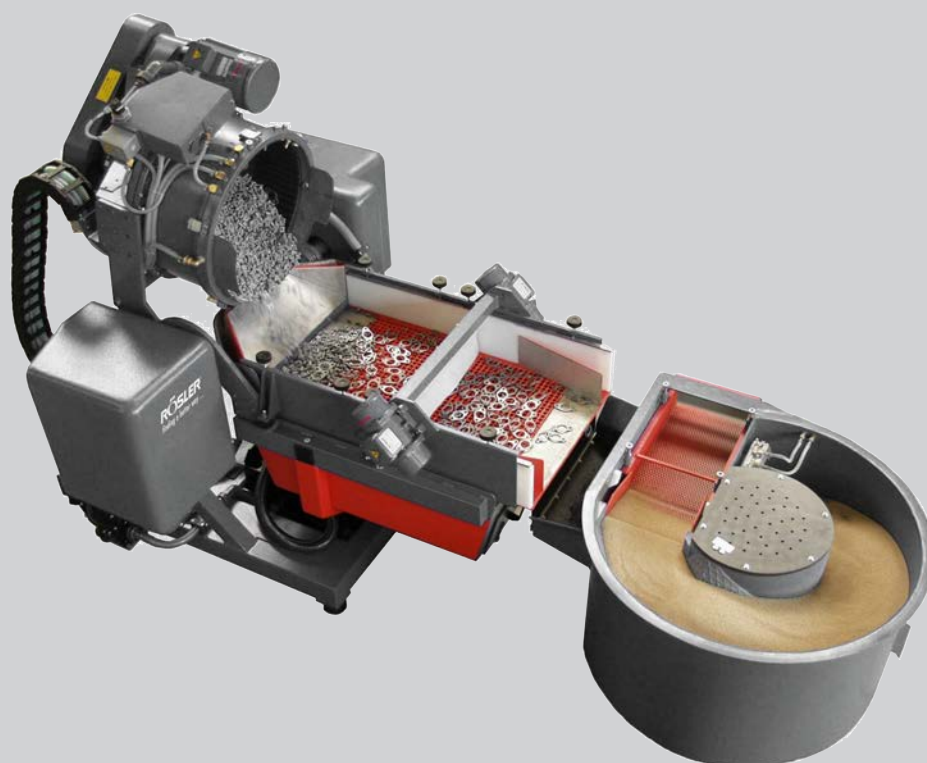
Semi-automatic compact centrifugal disk finishing machine with built-in separation unit



Semi-automatic compact centrifugal disk finishing machine with external separation unit



Automatic single batch centrifugal disk finishing machine linked to a rotary dryer



PRE- AND POST-TREATMENT SYSTEMS

Industrial washing machines, spray and immersion protection systems

Cleaning, passivation, phosphating, placing a protective oil film on the work pieces and drying can be linked to mass finishing processes as pre-and post-treatment systems. Rösler offers a

wide range of treatment systems that can be linked together for fully automatic operation or utilized as stand-alone units.

Belt washing machine



Rotary vibrator with belt spray washing station and hot air belt dryer



DRYING WITH DRYING MEDIUM

Rotary vibratory dryer

Rotary vibratory dryers come in different sizes to match the capacity requirements of the different mass finishing machines. Filled with drying medium these units can dry the work pieces continuously in one single pass as well as with batch operation without leaving any residual spots.



Glimpse into a rotary vibratory dryer: Maizorb (granulated corn cobs) absorbs moisture and removes contaminants from the work piece surface.

Drum dryer

The rotary drum dryers, filled with drying medium, are used for drying work pieces that are cup shaped, not delicate and have relatively large surface areas.



DRYING WITH HOT AIR

Dryers with drying medium are not suitable for drying work pieces with narrow blind openings and small drilled or threaded holes, because drying medium might get lodged in these cavities. For such

cases hot air drying systems ensure trouble-free drying operations. By wetting the finished work pieces with de-mineralized water, residual spots on the work piece surface can be largely prevented.

Hot air drying centrifuge

The drying effect in these units is generated by centrifugal force and hot air. They are used for drying complete batches of very small, non-delicate and thin, flat work pieces that tend to stick to each other.



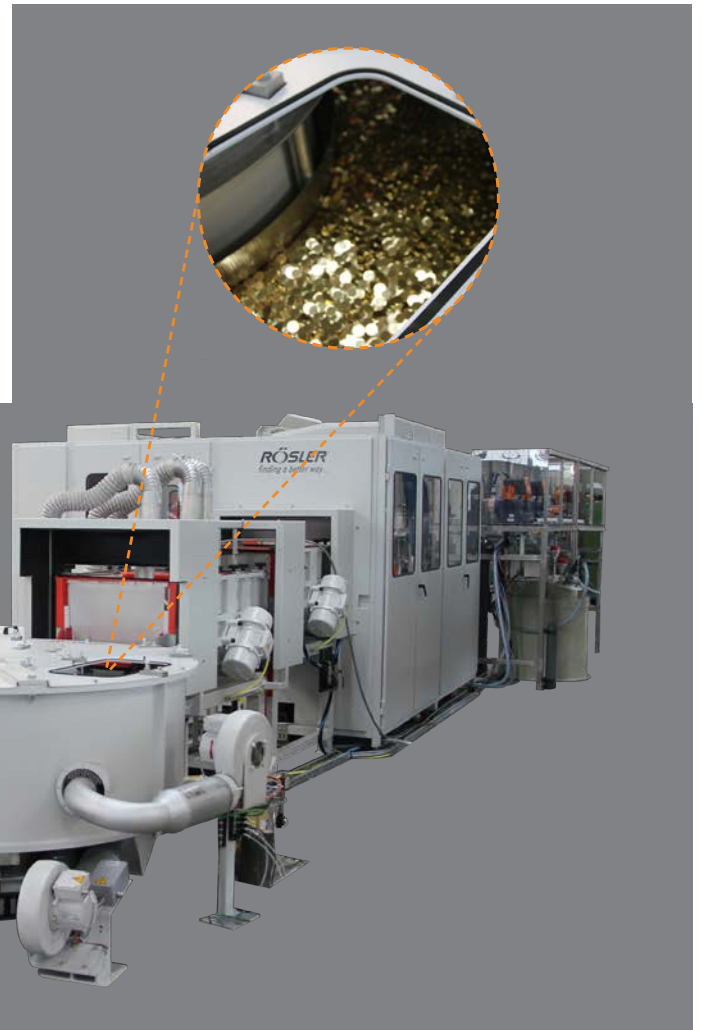
Hot air belt dryer

When it comes to the gentle drying of housings, work pieces with threaded or drilled holes, undercuts or components with critical sealing surface areas, belt dryers are the ideal solution. Placed on a wire mesh belt, the work pieces are passing through an electrically heated drying tunnel.



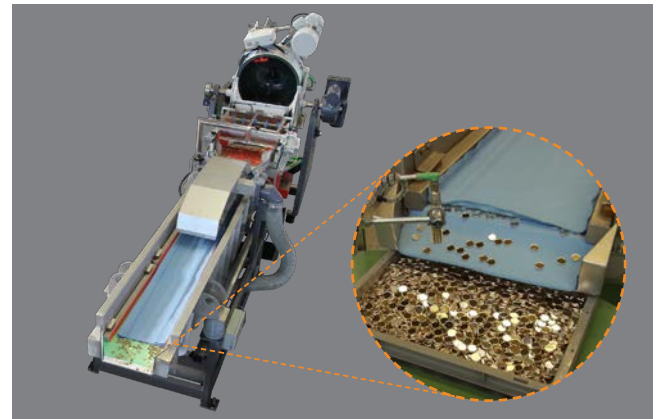
Hot air rotary vibratory dryer

The work pieces are dried with hot air instead of drying medium by continuously passing through the vibrating processing channel. This dryer type is used for relatively small, non-delicate or cup shaped parts. Even thin, flat components are dried without any residual water spots.



Linear dryer

Delicate, flat work pieces that must not nick each other, for example, polished coin blanks, are passing between two sheets of cloth through an electrically heated tunnel vibrating at low amplitude. The result: No dust, no water spots and no nicked work pieces.



Hot air drum dryer

Work pieces with complex shapes, undercuts and blind and threaded holes are constantly tumbling over each other and dried with hot air without any drying medium.



ENVIRONMENTAL TECHNOLOGY

Process water recycling

Most mass finishing processes can be run with process water recycling systems constantly cleaning the process water and feeding it

back into the mass finishing machine. For cleaning of more complex wastewater traditional floc & drop systems are available.

Fully automatic process water recycling system



Semi-automatic, compact recycling system



Cleaning of industrial liquids with centrifugal filters

Decades of experience in cleaning mass finishing wastewater contaminated with abrasive fines went into the development of centrifugal cleaning systems for other industrial liquids.

Cleaning and recycling of contaminated liquids from

- ▶ Machining centers
- ▶ Grinding of glass (spectacle industry)
- ▶ Solar/wafer production (grinding, saw cutting)
- ▶ Paint booths
- ▶ ECM (electrochemical machining)
- ▶ High pressure water jet blasting
- ▶ Recycling systems for precious materials
- ▶ Dewatering of sludge



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 tailor-made 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.

THE RÖSLER TOTAL SOLUTION

Vibratory finishing tools

The Rösler group is the global leader in the development and production of mass finishing consumables and equipment. With our broad R & D activities and close proximity to our customers

we continuously develop solutions that meet the finishing requirements of our time.

1. Finishing task

Work pieces from the customer

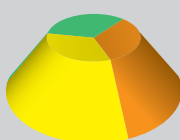


2. Process development

In-house test centers for:

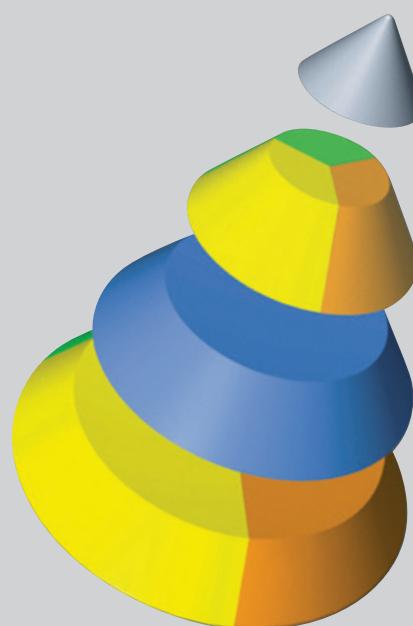
Shot blasting

shot blast machine
blast media
dust collector



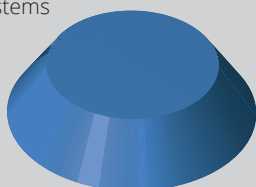
Mass finishing

mass finishing machine
grinding & polishing media
compounds



3. Engineering

Equipment manufacturing, Peripheral equipment, Interlinked systems

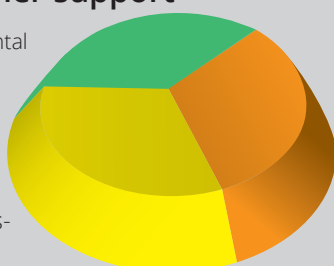


4. Customer support

Environmental technology

After-Sales-Service

Delivery assembly training



5. Production at the customer site

Mass Finishing
Shot Blasting
AM Solutions
www.rosler.com

Germany

Rösler Oberflächentechnik GmbH

Werk Memmelsdorf
Vorstadt 1
D-96190 Untermersbach
Tel.: +49 9533 / 924-0
Fax: +49 9533 / 924-300
info@rosler.com

Rösler Oberflächentechnik GmbH

Werk Hausen
Hausen 1
D-96231 Bad Staffelstein
Tel.: +49 9533 / 924-0
Fax: +49 9533 / 924-300
info@rosler.com

USA

Rösler Metal Finishing USA, L.L.C.

1551 Denso Road
USA-Battle Creek
MI 49037
Tel.: +1 269 / 4413000
Fax: +1 269 / 4413001
rosler-us@rosler.com

France

Rösler France

Z.I. de la Fontaine d'Azon
CS 50513 - St. Clément
F-89105 Sens Cedex
Tel.: +33 3 / 86647979
Fax: +33 3 / 86655194
rosler-fr@rosler.com

Italy

Rösler Italiana S.r.l.

Via Elio Vittorini 10/12
I-20863 Concorezzo (MB)
Tel.: +39 039 / 611521
Fax: +39 039 / 6115232
rosler-it@rosler.com

Switzerland

Rösler Schweiz AG

Staffelbachstraße 189
Postfach 81
CH-5054 Kirchleerau
Tel.: +41 62 / 7385500
Fax: +41 62 / 7385580
rosler-ch@rosler.com

Spain

Rösler International GmbH & Co. KG

Sucursal en España
Polg. Ind. Cova Solera C/Roma, 7
E-08191 Rubí (Barcelona)
Tel.: +34 93 / 5885585
Fax: +34 93 / 5883209
rosler-es@rosler.com

Netherlands

Rösler Benelux B.V.

Reggestraat 18
NL-5347 JG Oss
Postbus 829
NL-5340 AV Oss
Tel.: +31 412 / 646600
Fax: +31 412 / 646046
rosler-nl@rosler.com

Belgium

Rösler Benelux B.V.

Avenue de Ramelot 6
Zoning Industriel
B-1480 Tubize (Saintes)
Tel.: +32 2 / 3610200
Fax: +32 2 / 3612831
rosler-be@rosler.com

Austria

Rösler Oberflächentechnik GmbH

Hetmanekgasse 15
A-1230 Wien
Tel.: +43 1 / 6985180-0
Fax: +43 1 / 6985182
rosler-at@rosler.com

Romania

Rösler Romania SRL

Str. Avram Iancu 39-43
RO-075100 Otopeni/ILFOV
Tel.: +40 21 / 352 4416
Fax: +40 21 / 352 4935
rosler-ro@rosler.com

Russia

Rösler Russland

Borovaya Str. 7, bldg. 4, office 107
111020 Moscow
Tel. / Fax: +7 495 / 247 55 80
rosler-ru@rosler.com

Great Britain

Rösler UK Ltd.

Unity Grove, School Lane
Knowsley Business Park
GB-Prescot, Merseyside L34 9GT
Tel.: +44 151 / 4820444
Fax: +44 151 / 4824400
rosler-uk@rosler.com

Brazil

Rösler Otec do Brasil LTDA

Av. Antonio Angelo Amadio, 1421
Centro Empresarial Castelo Branco
18550-000 Boituva
São Paulo - Brasil
Tel.: +55 15 / 3264-1117
Tel.: +55 15 / 3264-1112
info@rosler-otec.com.br

China

Rösler SURFACE-TECH (BEIJING) CO., LTD.

Beijing Office
Fu Hua Mansion, Office A-11-K
No. 8, Chao Yang Men North Avenue
Beijing 100027, P.R. China
Tel.: +86 10 / 6554 73 86
Fax: +86 10 / 6554 73 87
rosler-cn@rosler.com

and over 150 additional distributors
around the world



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