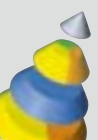


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Process Water Recycling Systems
Chemical Flocculation Systems



Process Water Recycling

Not only for environmental reasons process water recycling is the preferred waste water treatment method in mass finishing applications, but also because such recycling systems produce significant cost savings. The principle of the 2-phase separation (separation of the solid from the liquid phase) by centrifugal force is the central feature of modern process water cleaning systems. Powerful equipment combined with proven process technologies offers a wide range of applications which include not only mass finishing but also the cleaning of process liquids in other industrial production processes.

Functional principle

The effluent to be cleaned flows either directly from the mass finishing system to the centrifuge by gravity, or it is transported to the centrifuge with a lifting (pump) station. A fine mesh coarse particle screen installed in the inlet pipe of the collecting tank prevents larger solid particles from entering the system. A stirring device in the collecting tank keeps solid fines in the process water in suspension. A compressed air diaphragm pump transports the effluent from the collecting tank into the rotary drum of the centrifuge. The rotational speed of up to 3,000 RPM separates the "liquid" from the "solid" phase and, while the high centrifugal force in the rotary drum causes the solid particles suspended in the process water to be deposited on the drum wall in form of sludge, the cleaned process water ("liquid phase") is picked up by a peeling nozzle and transported ("recycled") either directly back to the mass finishing machine or to an intermediate storage tank. In semi-automatic systems the sludge with a residual water content of as low as 20% can be easily removed from the centrifuge with a polyurethane basket that is inserted into the rotary drum. Rösler also offers automatic systems which use a sludge peeling knife for fully automatic extraction of sludge from the rotary drum. Depending on the application, several mass finishing systems can be connected to one single process water recycling system.



Fully automatic system "ASS"

Fields of application:

While Rösler centrifugal systems have become the standard for removing solid particles from the process water in mass finishing applications, this technology can be utilized for many other applications:

- ▶ Machining centers: Cleaning of coolants and grinding oil
- ▶ Technical ceramics: Process water cleaning for saw cutting, grinding and polishing
- ▶ Glass processing: Various grinding and polishing applications for optical systems
- ▶ Solar / wafer production: Saw cutting, grinding
- ▶ Paint systems: Removal of the overspray sludge in wet paint applications
- ▶ ECM processes: Cleaning of the electrolytes
- ▶ High pressure water jet system: Metal processing in the aerospace industry
- ▶ Recycling of valuable materials: Reclaim of gold, silver, copper and other valuable metals from the process water
- ▶ General sludge treatment: Reduction of the residual water content in sludge prior to its disposal at a sanitary landfill



ISO 9001: 2008

Environmentally friendly consumables (media and compounds) are an excellent basis for optimum process water cleaning

When it comes to solving surface finishing and surface preparation problems, Rösler is the only supplier who offers the complete solution. In addition to the comprehensive range of surface treatment equipment, Rösler also produces ceramic and plastic grinding and polishing media, compounds and waste water/process water cleaners ("flocclulants"). Several thousand Rösler process water recycling systems are successfully running in various industries and applications. Why not use our extensive experience and knowhow for your application, too?



Rösler Turbo-Floc® System

The Turbo-Floc® System developed by Rösler enhances the mechanical cleaning effect of the centrifuge by the injection of special process water cleaning compounds. This results in a degree of cleanliness that meets the most stringent quality standards. Extremely fine particles are bundled into larger "flocs" which can be separated from the process liquid more effectively. A welcome side effect is that the mass finishing compounds in the process water are not affected and are more or less completely returned to the finishing process. Even emulsified and free oil can be separated and removed from the process liquids with special process cleaners.

Depending on the required capacity and the specific operating conditions, either semi-automatic centrifuges of the type Z 800 HA or fully automatic centrifuges type Z 1000 ASS II are utilized.

The result

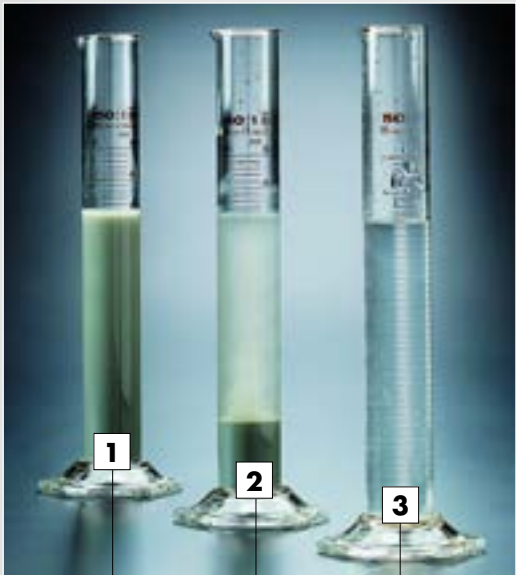
- ▶ Very clean parts with no surface residues
- ▶ Highly stable operating conditions
- ▶ Long life of process water before replacement

Process water before treatment

Process water after addition of a process cleaner ("flocclulant")
(The enlarged solid particles ("flocs") have settled at the bottom.)

Process water after treatment in a centrifuge

(The solids are separated from the liquid and deposited as sludge on the drum wall)



Process Water Cleaners (circulation systems)

Liquid for circulation systems

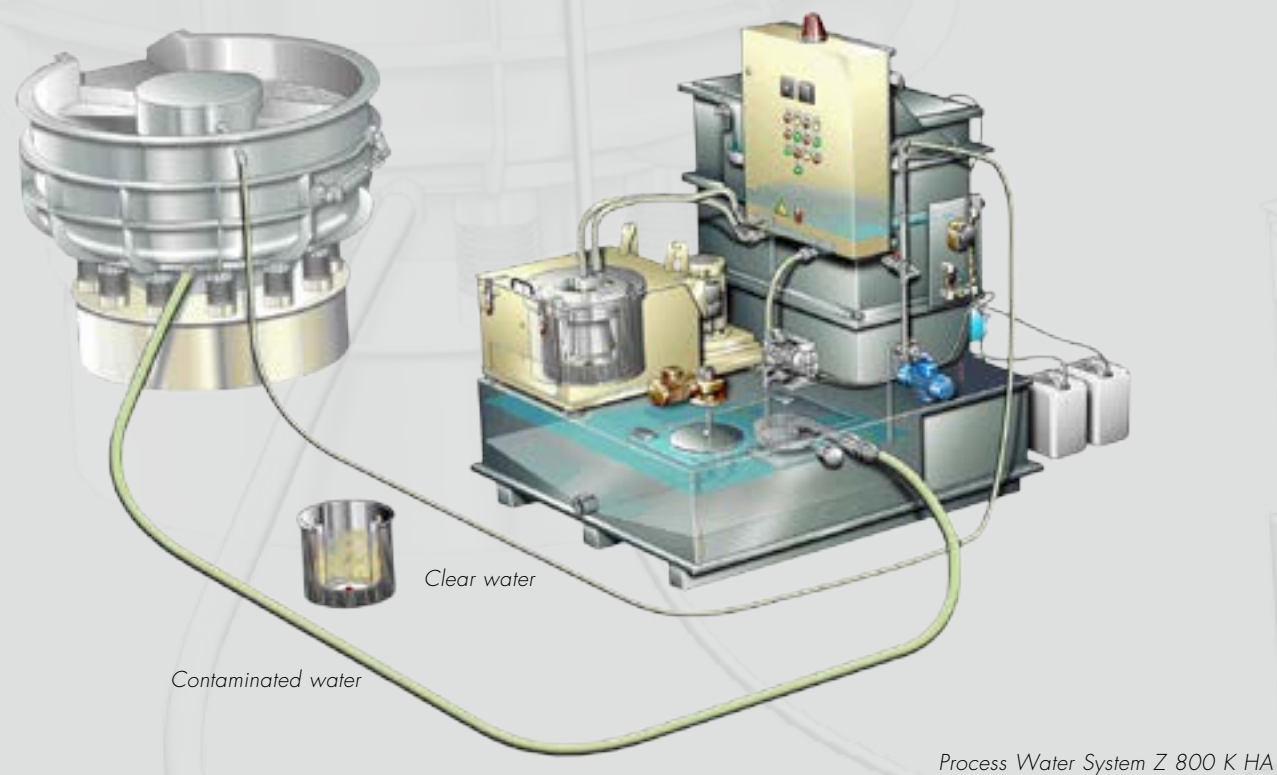
Type	AR 8400	AR 8403	AR 8404	AR 8405	AR 8407
Function	Cationic Polymer for keeping the recycling system stable				
Consumption	As supplied or mixed with water at a ratio 1:4 up to 1:10: Approximately 0,1 - 1,0 kg/m ³				

Powder for circulation systems

Type	AR 7120	AR 7134
Function	Powder flocclulants for effective removal of oil and grease from recycling systems; no buildup of salt in the process liquid	
Consumption	Depending on the degree of contamination from 0.1 kg/m ³ up to 1.0 kg/m ³	

Semi-automatic compact centrifuges

This range of centrifuges provides excellent cleaning characteristics as well as requiring very little space. The complete unit with electric controls, collecting and clear water tank is shipped to the customer pre-installed, requiring no on-site installation.



Constant Process Water Temperature

Maintaining a constant, relatively low, process water temperature is very important for the equipment as well as for the finishing process. In certain mass finishing applications – especially in high energy centrifugal systems – the finishing process produces a significant amount of heat which is dissipated by the process water. This high process water temperature can cause poor processing results and damage on the equipment. Powerful cooling systems prevent such unwanted temperature increases and guarantee a stable finishing process.



Technical features

Sturdy and corrosion-resistant collecting and clear water tanks made from polyethylene.

- ▶ Collecting tank with angled bottom and stirring device
- ▶ Easy-to-replace coarse particle screen
- ▶ Level control via level switches with emergency stop
- ▶ Lifting / Pump station for transporting effluent from finishing machine to centrifuge (optional)
- ▶ Robust, easy-to-operate pump systems
 - Effluent from finishing system: Compressed air diaphragm pump
 - Clear water: Electric or diaphragm pump
- ▶ Multiple cleaning of the process water by overflow from clear water tank to collecting tank
- ▶ Precision balanced drum made of aluminum (optional: Stainless steel drum for corrosive liquids)
- ▶ Conical guiding system in drum for best separation conditions
- ▶ Automatic residual water discharge from the drum
- ▶ Flexible sludge insert for easy removal of sludge
- ▶ Automatic water and compound top-up system (optional)
- ▶ Turbo-Floc® package for dosing of process cleaner (optional)
- ▶ Control panel with PLC controller
- ▶ Device to monitor if centrifuge lid is in "locked" position



Z 800 K HA Turbo Floc® with collection and clear water tank



Z 800 HA Turbo Floc® with collection tank

Machine type	Z 800 HA Turbo-Floc®	Z 800 K HA Turbo-Floc®
Rotational speed (RPM)	3160	3160
g-value	2010	2010
Max. sludge capacity (l) Sludge volume (kg)	15 22	15 22
Capacity ¹ (l/h)	100 – 1200	100 – 1200
Total installed power (kW)	5,0	5,0
Average power consumption (kW)	1,6	1,7
Collecting tank (l)	250	340
Clear water tank (l)	–	400
Process water cooling system	–	optional
Automatic top-up system for water and compound	optional	optional

¹ For mass finishing liquids, depending on amount of solids in effluent and desired cleaning effect

Process Water Recycling Systems with automatic Sludge Removal

In mass finishing applications with large water and sludge volumes the use of semi-automatic “basket” centrifuges with manual removal of the sludge from the rotary drum is no longer economically feasible. In such cases, centrifugal systems type ASS with automatic sludge removal from the rotary drum are utilized. After the rotary drum has come to a complete stop, in the ASS systems the sludge is automatically “peeled” from the drum wall with a peeling knife and dropped into a sludge container located below the drum. This container has a holding capacity of 300 liters. To prevent imbalances which could cause premature bearing failures during subsequent operation, the drum is rinsed after each peeling cycle to remove sludge residues from the drum wall. All centrifuges are equipped with an imbalance monitor which automatically turns the centrifuge off, if such an imbalance occurs.



Technical features of Rösler Automatic Process Water Circulation Systems

- ▶ Impulse controlled pump for pumping effluent into rotating drum
- ▶ Clear water transport by compressed air diaphragm pump
- ▶ Multiple cleaning of the process water by overflow from clear water tank to collecting tank
- ▶ Turbo-Floc® package for dosing of process cleaner
- ▶ Centrifuge equipped with filling pipe and clear water collecting nozzle
- ▶ Precision balanced drum made of aluminum (optional: Stainless steel drum for corrosive liquids)
- ▶ Electronically controlled peeling knife made from hardened, wear-resistant steel
- ▶ Movable sludge cart with tilting device for unloading sludge
- ▶ Residual water collecting pan, pneumatically operated
- ▶ Automatic water and compound top-up system (optional)
- ▶ Fully automatic operation controlled by PLC
- ▶ Vibration check of the centrifuge drum with Auto-Stop function
- ▶ Powerful main drive; frequency converter for variable drum speed

The recycling tanks

The volume of the recycling tanks is determined by the required process water quantities.

Combi-Tank:

Combined tank with dual-chamber system, designed as a collecting and clear water tank with a capacity of 2 x 700 liters.

Stand-alone tanks:

Separate collecting tank and clear water tank with capacities of 2 x 1,000 liters, alternatively 2 x 2,000 liters.

Technical Details:

- Sturdy tanks made of high quality polyethylene
- Easy-to-replace coarse particle screen
- Level control with float switch and emergency stop
- Angled bottom for complete discharge
- Collecting tank equipped with stirring device.

Optional stirring device for clear water tank available.

- Robust, wear-resistant diaphragm pumps

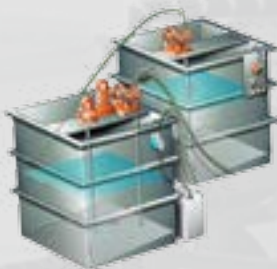
Lifting station:

For transporting the effluent from the finishing machine to the water treatment system.

- Robust tank made from polyethylene with angled bottom
- Compressed air diaphragm pump with level control
- Coarse particle screen



Combi-Tank



Stand-alone Tank



Lifting station

Technical Data

Type	Z 800 ASS II-Turbo Turbo-Floc®	Z 1000 ASS-II-Turbo Turbo-Floc®
Rotational speed (RPM)	2770	2770
g-value	1500	2000
Max. sludge capacity (l) Sludge volume (kg)	14 16	28 30
Capacity ¹ (l/h)	500 – 2000	800 – 3500 ²
Total installed power (kW)	5,5	11
Average power consumption (kW)	2,2	6,5
Collecting tank (l), size optional	700 / 1000	700 / 1000 / 2000
Clear water tank (l), size optional	700 / 1000	700 / 1000 / 2000
Process water cooling system	optional	optional
Automatic top-up system for water and compound	optional	optional

¹ For mass finishing liquids, depending on amount of solids in effluent and desired cleaning effect

² for low solid concentrations up to 12,000 l/h

Chemical waste water treatment – flocculation systems

Chemical waste water treatment systems based on the flocculation principle complement our comprehensive range of process water recycling systems. Flocculation systems are usually used in applications which do not allow recycling of the process water. The one-time use of process water is always required, when parts from different metals are processed, when extremely strict requirements for the surface cleanliness of the processed parts exist or, when mass finishing applications require the use of acidic compounds. In all these cases the recycling of the process water is not possible. Since the cleaned waste water goes to drain, the level of hazardous materials in the cleaned waste water must be below the legal limits. The chemical-physical waste water treatment systems utilizing the proven flocculants of the AR range ensure that these legal limits are met.

Functional principle

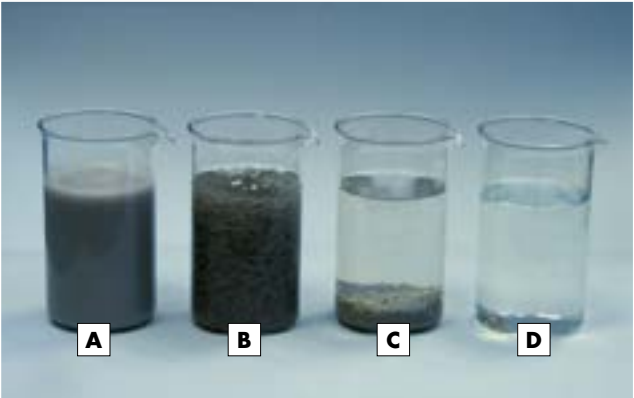
The effluent is cleaned according to the “floc and drop” principle:

Step A: Collection of a batch of effluent

Step B: Separation of solids from the liquid phase by flocculation

Step C: Sedimentation of the flocs

Step D: Filtration/ Water extraction from the sludge; occasionally partial recycling is possible



Semi automatic Systems, Series C-SF and C-FP

The series C-SF and C-FP systems are used for the treatment of relatively small quantities of effluent which for economical reasons do not allow a high degree of automation but require the same degree of treatment effectiveness as larger systems.

Buffering and processing are done in one tank. The low height of the tank allows a gravity feed of the waste water from the vibratory finishing machine into the tank.

Depending on the water and sludge quantities, the extraction of water from the sludge can be done by either a bag filter or filter press.



AWA 500 C-SF

Chemical and Mechanical Waste Water Treatment (precipitation/ flocculation)

Powder flocculants for the chemical waste water treatment

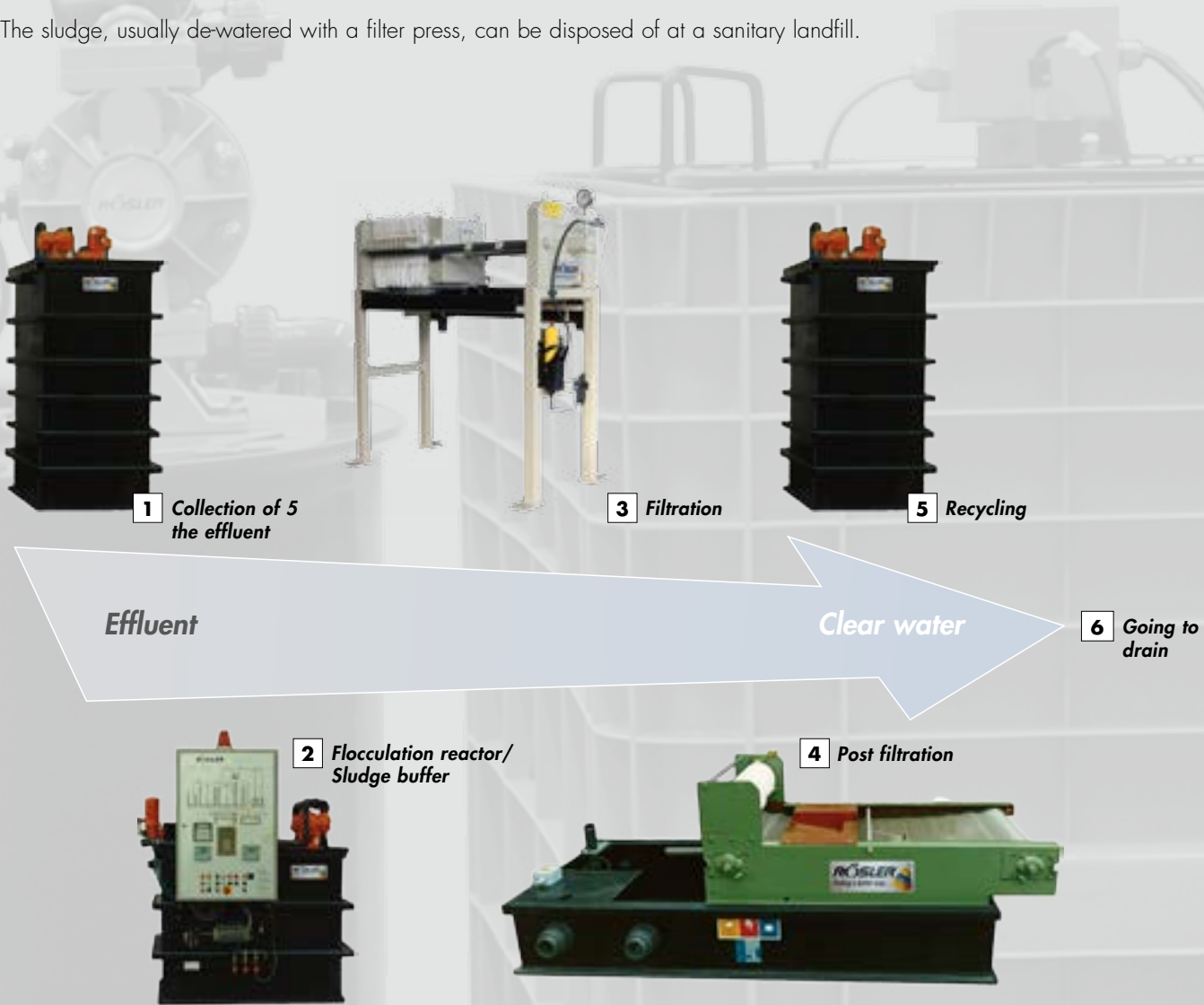
Type	AR 7009	AR 7090	AR 7038	AR 7234
Function	Powder flocculant for removal of oil, grease and metal fines from mass finishing effluents			
Consumption	Depending on the degree of contamination of the effluent: Approximately 1 kg/m³ up to 10 kg/m³			

effective: 05/12

Fully automatic flocculation systems

For effluent quantities of more than 500 liters/h, fully automatic treatment systems, type AWA-KFP, are recommended. In such systems a PLC controller monitors and controls the effluent quantity entering the system, the PH – neutralization of the effluent, the dosing of the flocculation compound and the final control filtration of the clear water.

The sludge, usually de-watered with a filter press, can be disposed of at a sanitary landfill.



System			Capacity per hour or batch	Thin sludge de-watering	Filter size
Semi-automatic	C-SF	500	500 l/ Charge	Tandem bag filter	2 x 120 l
	C-SF	1000	1000 l/ Charge	Tandem bag filter	2 x 120 l
	C-FP	1000	1000 l/ Charge	Filter press	4/ 15/ 30 – 15
	C-FP	2000	2000 l/ Charge	Filter press	4/ 15/ 30 – 15
Fully automatic	K-FP	1000	1000 l/h	Filter press	4/ 15/ 30 – 15 ¹
	K-FP	2000	2000 l/h	Filter press	4/ 15/ 30 – 15 ¹
	K-FP	4000	4000 l/h	Filter press	6/ 15/ 25 – 15 ²

¹ Plate volume 3,2 l

² Plate volume 10 l

effective: 06/05

Recycling of process water with special recirculation tanks

Rösler recirculation tanks, model range R... AB

For certain mass finishing processes requiring only small quantities of process water, the use of a high performance centrifugal filtering system may not be economical. For such applications the utilization of recirculation tanks has proven to be highly cost effective.

The waste water from the mass finishing system is transferred into the multi chamber tank where solids like media, metal fines, etc... settle in the bottom of the tank. Upon demand a pulse controlled air operated double-diaphragm pump transports exact quantities of cleaned process water back to the mass finishing machine. By installing a solid particle filter the quality of the process water can be further improved.

Initial filling of the tank takes place with city water and the addition of a predetermined quantity of compound. The inevitable water losses are compensated by a water/compound top-up system.

To facilitate the occasional manual removal of the sludge from the tank bottom, the partitions between the various chambers can be easily removed and reinstalled. The length of the cleaning intervals depends on the amount of solids generated by the mass finishing process. Overall, this system requires very little labor input.

The Rösler recirculation tanks are available in four sizes accommodating various process water quantities. To prevent any chance of corrosion, they consist of easy to clean, very sturdy plastic plates that are welded together. The use of these efficient recirculation tank systems helps to significantly reduce the consumption of water and compound, thus resulting in a highly cost effective surface finishing operation for a wide range of work pieces.



R 350 AB

Available sizes

	R 150 AB	R 350 AB	R 750 AB	R 1100 AB
Tank capacity (l)	150	350	750	1100
Suitable for waste water (l / h) up to	approx. 30	approx. 70	approx. 150	approx. 220
Tank dimensions: l x w x h (mm)	700 x 400 x 580	1150 x 760 x 520	1990 x 970 x 520	1990 x 1310 x 520
Inlet height (mm) process water	450	440	440	440

effective: 10/13

finding a better way ...



When it comes to dealing with surface finishing and surface preparation problems, Rösler offers **the process solution!** Our customers can choose between two processing technologies, **Vibratory finishing** or **Shot blasting**, which offer virtually unlimited possibilities. Through extensive processing trials, we always find the right finishing solution for our customer's needs. This includes not only the development of a specific finishing process, but also the selection of the right equipment and consumables. We deliver the solution to satisfy your surface finishing requirements. Our success in the market proves that we are right. It is not by chance that our innovative developments and our high quality standards have established Rösler as the world technology and market leader in surface finishing and shot blasting.

In more than 60 countries we support our customers with a closely-knit network of Rösler subsidiaries and sales representatives.

We are the only company in our field operating test and demonstration centres throughout the world. This allows us to run test trials under real production conditions close to our customers. This offers several advantages: Our customers save time and money, and at the same time – through our professional processing trials and advice – they are assured of receiving the best process solutions and products available on the market!

Worldwide Demonstration and Test Centres

Our main test centers for vibratory finishing and shot blasting are located at the Rösler headquarters in Untermerzbach, Germany:

- more than 95 vibratory finishing and shotblasting systems
- working space: approx. 2,700 square meters

Similar test centres are located in the United States, Great Britain, France, the Netherlands, Belgium, Switzerland, Russia, Spain, Italy, Austria, South Africa and Brazil.

The Total Process Solution

Consumables, machines and process safety in perfect combination:

- The optimum interaction between consumables, machinery and process stability produces excellent finishing results
- Cost saving automation allows running multiple process steps without any operator intervention
- Comprehensive training of your operators and maintenance staff
- After-sales service guarantees high uptimes for your equipment

Environmental Protection Team Spirit – Top Quality

The consideration of environmental issues guarantees a high level of product quality and environmental protection. For example, circulating the process water is a key feature of our mass finishing technology. In this case, the positive effect on the environment is reflected in savings of compound and water of up to 95%. At the same time, a high level of process reproducibility and finishing quality is guaranteed.

The consideration of ecological aspects in all our manufacturing processes results in eco-friendly and – at the same time – high quality products. In this respect the recycling of the process liquids is a central feature of our state-of-the-art mass finishing systems. The positive environmental impact of these recycling systems is directly reflected in compound and water savings of up to 95% compared to conventional mass finishing processes. Furthermore, such recycling systems guarantee high quality finishing results and absolute process repeatability which are an essential requirement for today's high volume industrial production.



D RÖSLER Oberflächentechnik GmbH · Werk Memmelsdorf
Vorstadt 1 · D-96190 Untermerzsbach
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

F 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

I 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

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

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

E 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

NL 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

B 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

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

RO RÖSLER Romania SRL
Str. Horia Closca si Crisan 17-19 · RO -075100 Otopeni/ILFOV
Tel.: +40/21/352 4416 · Fax: +40/21/352 4935 · rosler-ro@rosler.com

RUS RÖSLER Russland
Borovaya Str. 7, bldg. 4, office 107 · 111020 Moscow
Tel. / Fax: +7 / 495 / 247 55 80 · Mob.: +7 / 495 / 505 23 15 · rosler-ru@rosler.com

BR RÖSLER do Brasil LTDA
Estrada dos Galdinos 35 · Jd. Barbacena · 06700-000 · Cotia · São Paulo - Brasil
Tel.: +55/11/46123844 · Fax: +55/11/46123845 · rosler-br@rosler.com

ZA RÖSLER S.A. Surface Technologies
P.O. Box 7949 · 66 Regency Drive · Route 21 Corporate Park · Irene Ext. 31 · ZA-0046 Centurion
Tel.: +27/12/345 2215 · Fax: +27/12/345 3731 · rosler-za@rosler.com

CN RÖSLER – BEIJING
Office 11N, Tower A, Beijing Fu Hua Mansion · No. 8, Chaoyangmen North Avenue
Dong Cheng District · Beijing 100027 P.R. China
Tel.: +86/10/6554 73 86 · +86/10/6554 73 89 · Fax: +86/10/6554 73 87 · rosler-cn@rosler.com

IND RÖSLER SurfaceTech Pvt. Ltd.
No.9, I Main Road, M.L.A Layout · R.T. Nagar · IND-Bangalore 560 032
Tel.: +91/80 23534445 · Fax: +91/80 23339165 · rosler-in@rosler.com

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RÖSLER Oberflächentechnik GmbH · www.rosler.com

