WALTHER TROWAL !

PROCESS WATER CLEANING TECHNOLOGY

TROWAL PROCESS WATER CLEANING TECHNOLOGY

for surface finishing applications

WE IMPROVE SURFACES

Process water – a significant cost factor

MASS FINISHING NEEDS PROCESS WATER

Water and cleaning compounds are two indispensable ingredients for nearly all "TROWALIZING" processes. Media and metal fines as well as oil and grease from the surface of the treated work pieces are accumulating in the process water. For this reason, the process water must be cleaned. Whenever the process water goes to drain, the legal standards for the cleaning process (e.g. flocculation) are quite stringent. For recycling of the process water the cleaning requirements are not quite as strict.The multiple use of the process water by recycling it, offers many advantages: The fresh water and compound consumption can be reduced by as much as 98%, respectively, 90%. And since no water goes to drain, the user does not need any approvals by the water authorities. In addition, the sludge disposal costs can be reduced, because the sludge coming from centrifuges contains about 50% less water than the sludge from flocculation systems. For certain mass finishing applications process water recycling is not possible, for example, for:

- Pickling with different types of acids
- Multi stage processes with multiple finishing compounds
- Applications with very strict cleanliness requirements for the surface of the finished work pieces.

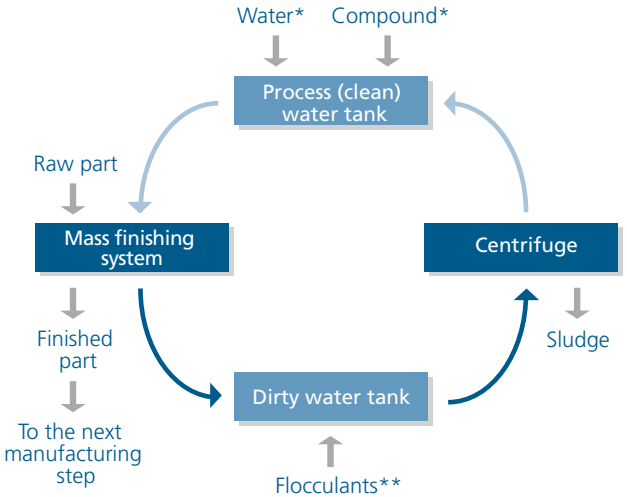
In such cases the wastewater must be flocculated and discharged to drain.

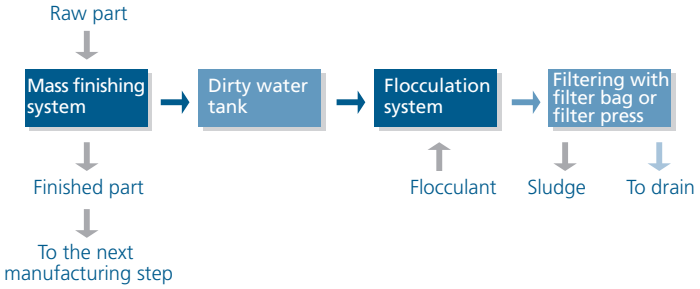
RECYCLING WITH CENTRIFUGES

The process water containing media and metal fines from the mass finishing process is passing through a centrifuge where the solids are removed from the liquid phase. By adding flocculants, oil and very fine solid particles </= 1 µ can be separated up to 100%. Of course, the cleaning compound is not affected and remains in the process water to be re-used!

THE FLOCCULATION PROCESS

By adding flocculants to the "dirty" process water the solids and most contaminants (chelated metals, oil and grease) are removed from the liquid. The cleaned water can then – in compliance with legal requirements – discharged to drain without any problems.





Contaminated process water
Solids in the form of flocks accumulating as sludge in the process water
Cleaned process water

* Because of process water carryout and evaporation water and compound must be continuously replenished

** Flocculants can be dosed into the contaminated water to form larger, easier to remove, flocks of emulsified grease and oil

Contaminated process water
Cleaned process water

Trowalpur flocculation – the classical waste water treatment system

CRISTAL CLEAR WATER

Any contaminated mass finishing process water, even if it is acidic or alkaline, can be transformed into clean water that qualifies to be discharged to drain.

GA 30-3 cleans up to 9,000 l/h (2,400 gal.)

SIMPLE ADDITION OF POWDER FLOCCULANT

Daily process water batches of </= 3,000 liter (790 gal) can be cleaned in an easy to operate low cost RT batch flocculation system. At the end of the workday a powder flocculant is sprinkled into the collected waste-water while being agitated with an electric stirrer. After a short time the formed flocks sink to the bottom of the tank. The generated sludge is then passed through either a filter bag or a filter press during the night.

FULLY AUTOMATIC FLOCCULATION SYSTEMS

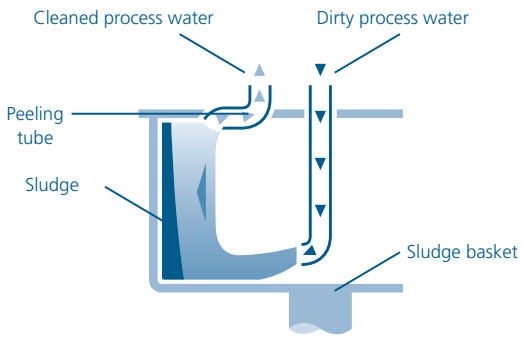
With an hourly capacity of up to 3,000 liter (530 gal) the fully automatic, PLC controlled GA or DO systems are ideal for bigger mass finishing operations generating large wastewater quantities. They have been proven over many years and are running batch-after-batch without any operator intervention. All key process steps are electronically monitored and in case of a malfunction the system is locked down making the whole process absolutely fail-safe.

Fully automatic systems	DO 03	GA 05	GA 10	GA 20	GA 30
Power requirements (kVA)	11	11	11	11	15
Capacity (l/h)	300	600	1,000	2,000	3,000
Dimensions	Dimensions can vary with the equipment design				
Filtration	Filter press	Filter press	Filter press	Filter press	Filter press

Semi-automatic systems	RT 05	RT 10	RT 20	RT 30
Power requirements (kVA)	2.5	3	3	3.5
Capacity (l/batch)	500	1,000	2,000	3,000
Dimensions	Dimensions can vary with the equipment design			
Filtration	Filter bag in frame	Filter bag in frame/filter press	Filter bag in frame/filter press	Filter bag in frame/filter press

CENTRIFUGAL FILTERING – THE SOFT CLEANING TECHNOLOGY

In centrifuges the solids are separated from the liquid phase with a centrifugal force of up to 2,417 G. Oil and/or media and metal fines </= 1.0 µm can be separated by the addition of flocculants. The cleaning compound is not affected and remains in the process water to be re-used!



Functional diagram of basket centrifuge

BASKET CENTRIFUGES, MODEL RANGE ZM

The models ZM 03-ECO 1 and ZM 03-FL are characterized by their sturdy design and ease of operation. The sludge basket is removed and emptied manually. It has a capacity of 14 liters (3.7 gal) allowing the separation of up to 19 kg (42 lbs.) of sludge in one cycle. Both models are equipped with a PLC for fully automatic operation including imbalance control and monitoring of the system status.

BASKET CENTRIFUGE MODEL ZM 03-FL

The universal, modular system for use with multiple vibratory finishing systems. Can be easily upgraded with process related options like pump stations and process water-cooling systems.

BASKET CENTRIFUGE MODEL ZM 03-ECO 1

This space saving unit (1.1 m2/12 sqft) can serve up to two vibratory finishing systems running standard mass finishing processes. The ideal equipment for stand-alone finishing systems.

Simple exchange of sludge basket. No tools required!

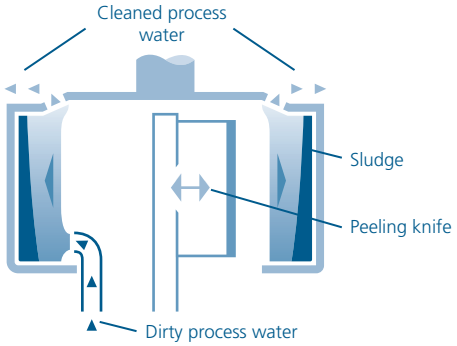
ZM 03-ECO 1
Photo shows centrifuge with optional pallet

ZM 03-FL
Photo shows centrifuge with optional pallet

	ZM 03-ECO 1	ZM 03-FL
Capacity (l/h)	1,000	1,000
Capacity sludge basket (l)	14	14
Maximum centrifugal force (G)	2.012	2.012
Dirty water tank (l)	200	300
Process (clean) water tank (l)	No	150
Dimensions in mm (LxWxH)	1,400 x 770 x 1,750	1,400 x 1,100 x 1,750
Average power requirements (kW)	1.5	1.5

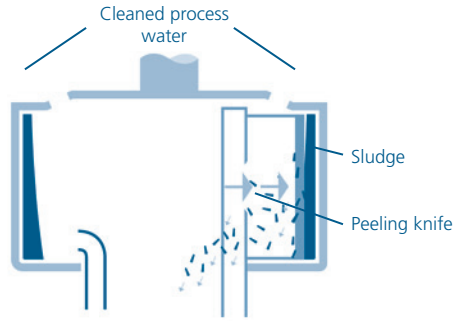
AUTOMATIC PEELING CENTRIFUGES, MODEL RANGE ZA

The fully automatic, PLC controlled models ZA 04 and ZA 06 can clean up to 2,000 liters/h of contaminated process water from mass finishing operations. In preset time cycles the sludge deposited on the inner wall of the rotary drum is automatically peeled out and dumped into a sludge container located below the drum. The modular design of the ZA model range offers multiple machine configurations allowing the ideal adaptation of the equipment to the specific customer requirements. These options include different dirty water and process water tanks, water-cooling systems, additional pump stations, various dosing systems, etc.



Automatic centrifuge in water-cleaning mode

	ZA 04	ZA 06
Capacity (l/h)	1,000	2,000
Capacity rotary drum (l)	14	28
Maximum centrifugal force (G)	1,920	2,417
Dirty water tank (l)	800	1,500
Process (clean) water tank (l)	400	1,000
Dimensions in mm (LxWxH)	2,500 x 1,700 x 2,100	2,100 x 2,800 x 2,350
Average power requirements (kW)	3	5



Automatic centrifuge in sludge-peeling mode

Peeling centrifuge ZA 04

Operational recommendations for everyday applications

RECYCLING WITH CENTRIFUGES

For mass finishing processes with recycling we recommend the following trowal compounds and trowalpur flocculants:

Application involving	ferrous metals	non-ferrous metals	trowal compound	trowalpur flocculant*
Much oil & few solid fines	Yes	Yes	DE 97, KFL, KRA	ESM
Much oil & many solid fines	Yes	Yes	DE 97, KFL, KRA	R, S
Little emulsified oil & many solid fines (plastic or metal)	Yes	Yes	KR 50, KFL, KRS	R, S
Little emulsified oil & few solid fines (or only ceramic media)	Yes	Yes	KR 50, KRS, KFL	ESM
Magnesium	No	only Mg	MK 20, SGK	No

* Flocculants are mainly used in combination with hot air drying of the finished parts and/or high oil quantities on the surface of the raw parts.

GOING TO DRAIN REQUIRES ABSOLUTE OPERATIONAL CONSISTENCY

Only the selection of the right Trowal flocculants ensures clean water that consistently complies with prevailing legal cleanliness standards before going to drain.

Equipment type	Flocculant	Dosing
GA/DO	LAC with F (liquid) + lime slurry	Automatic
RT	ESM or ESB powder	Manual

SLUDGE QUANTITY GENERATED FROM 1 (ONE) KG OF MEDIA

The quantity of sludge generated during the mass finishing process depends on the media consumption and the type of waste-water treatment.

Treatment method	Ceramic media			Plastic media		
	Mass (kg)	Residual water (%)	Volume (l)	Mass (kg)	Residual water (%)	Volume (l)
Centrifuge	1.55	35	0.95	1.8	45	1.4
Filter press						
- LAC flocculation	1.9	40	1.45	2.3	50	2
- ESM flocculation	2.1	40	1.6	2.5	50	2.2
Filter bag	3.1	60	2.6	4.2	70	3.9

TROWAL CENTRIFUGES CAN BE USED FOR MANY INDUSTRIAL LIQUIDS!

Whenever solids in the process liquid negatively influence a manufacturing process, trowal centrifuges offer the solution:

- Removal of paint sludge from the recycling water in paint booths
- Phosphating liquids
- Coolants used for treating metal/ceramic/stones/glass.
- Removal of undersize media in wet blast operations
- Removal of solids from industrial cleaning liquids
- Cleaning of oil

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Process water prior to cleaning

Process water after passing through a centrifuge

Customer service

TROWAL OFFERS A COMPREHENSIVE SERVICE PROGRAM

Services like professional consultation, the selection of the water treatment system that is right for you, quick on-site technical support and careful maintenance of your water treatment system ensure that your operation is running smoothly.

- On-site consultation by our specialist engineers
- Generation of customer specific equipment layouts
- Process water analysis in our chemical lab
- Return and eco-friendly disposal of your mass finishing sludge
- Maintenance contracts for centrifuges as required by the legal standards for accident prevention (in Germany UVV)

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