

PROCESS WATER TECHNOLOGY

TROWAL PROCESS WATER TREATMENT

for surface treatment applications

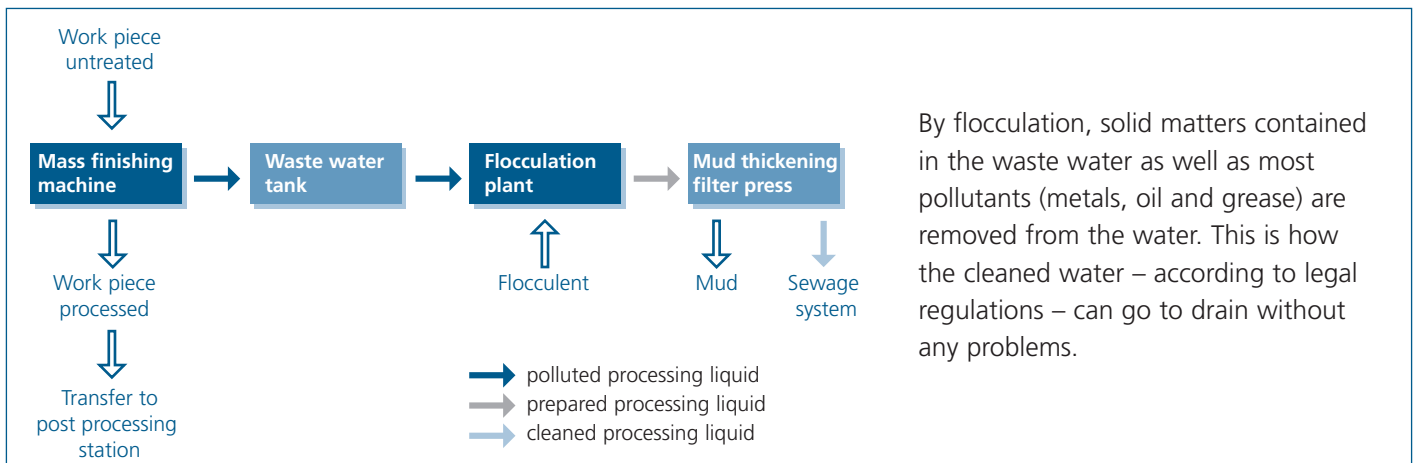
Process water – an important cost factor

It won't work without process water

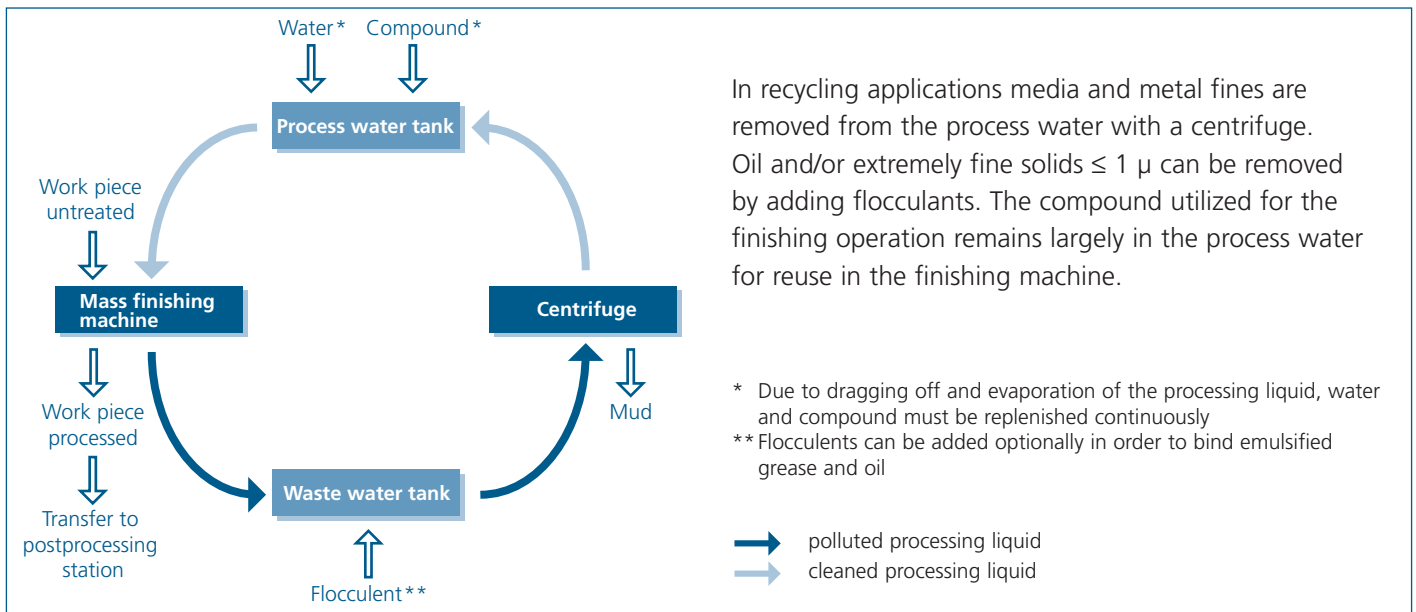
Water and compounds are essential for vibratory mass finishing. During the finishing operation the process water is polluted with fines from media, metal fines and oil or grease dragged in with the work pieces. Therefore, the water has to be cleaned. If process water should go to drain it has to be cleaned more thoroughly (via flocculation) than would be necessary with centrifugal recycling. The idea would be to constantly recycle the effluent from mass finishing operation. It saves not only water (up to 98 %), but also compound (up to 90 %). Furthermore, the user

does not need a permission for the discharge to the sewage from the Water Authorities, thus saving disposal costs (approx. 50 % less than with flocculation processes). For most mass finishing applications, recycling is possible. Occasionally however, there are applications where recycling is not advisable: For example pickling with acid or using several compounds in one process or the parts surface must be extremely clean. In such applications, a "single pass" system including flocculation of the waste water and transfer directly to drain is the most simple and safe process.

The flocculation process



Centrifugal recycling



Trowalpur flocculation – the classic complete water cleaning

Crystal clear water

All effluents from mass finishing – also acid or alkaline – can be transformed into clear water with a Trowalpur flocculation system.

Simply add powder

If the daily quantity of produced effluent is not larger than 3,000 l, it can easily be cleaned in an economical, easy to operate RT batch system. Flocculent powder is added to the waste water collected in a waste water tank with stirrer during working hours. After a short while, flocs are formed and sink to the bottom of the tank. During night, they are filtered off (filter bag or filter press).

Fully automatic flocculation

With a performance of up to 2,000 litres per hour, the fully automatic, PLC controlled GA or DO systems are perfectly suited for the use in larger mass finishing companies. They have been in operation for many years and process batch by batch without the need for an operator. Many control and locking functions guarantee a stable and safe process.



RT 05 in REC

Fully automatic machine	DO 03	GA 05	GA 10	GA 20
Connected loads (kVA)	11	11	11	11
Capacity (ltr/h)	300	600	1,000	2,000
Dimension (mm) (L x B x H)	1,600 x 2,000 x 1,900	1,600 x 2,000 x 1,900	2,000 x 2,000 x 1,900	2,200 x 2,200 x 2,800
Mud thickening	filterpress	filterpress	filterpress	filterpress

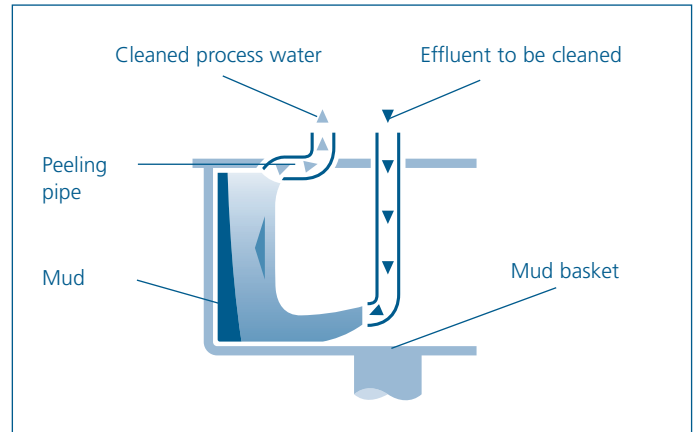
Semi-automatic machine	RT 05	RT 10	RT 20	RT 30
Connected loads (kVA)	2.5	3	3	3.5
Capacity (Litre/batch)	500	1,000	2,000	3,000
Dimension (mm) (L x B x H)	3,000 x 1,300 x 1,120	Ø 1,600 x 2,000 reactor	Ø 2,000 x 2,000 reactor	Ø 2,200 x 2,200 reactor
Mud thickening	filter stand	filter stand / filterpress	filter stand / filterpress	filter stand / filterpress

Centrifugal technology – the gentle cleaning method

With the centrifugal filter technology solid fines are removed from the process water with a centrifugal force which is up to 2.417 times higher than the gravity of earth.

Basket Centrifuges ZM

The model range “ZM 03 ECO 1” and “ZM 03 FL” are easy-to-handle, robust constructions with manual discharge and emptying of the mud basket. In one cycle, up to 14 litres (19 kg) of mud can be separated. Both models are equipped with PLC for fully automatic operation.



Functional sketch of a basket centrifuge

Basket centrifuge ZM 03-FL

The universal solution for the use with 2 - 3 mass finishing vibrators. Later on, process specific options such as pump station and cooling system can still be added.

Basket centrifuge ZM 03-ECO 1

The solution for the use with one mass finishing vibrator. Suited for standard and isolated applications.

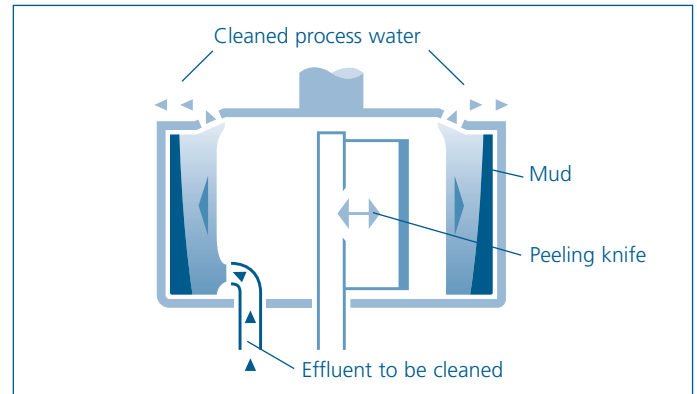
	ZM 03-ECO 1	ZM 03-FL
Capacity (l/h)	1,000	1,000
Mud volume (l)	14	14
Centrifugal rating (g)	2,012	2,012
Waste water tank (l)	200	300
Process water tank (l)	-	150
Dimensions (mm) (L x B x H)	1,400 x 770 x 1,750	1,400 x 1,100 x 1,750
Motor power-average (kW)	1.5	1.5



Basket centrifuge ZM 03-FL

Automatic peeling centrifuge ZA

The PLC controlled, automatic centrifuges ZA 04 and ZA 06 can clean up to 2000 litres of mass finishing process water per hour. The mud deposited on the wall of the rotating drum is automatically removed with a “peeling” knife and dropped into a mud container according to preset time intervals. Due to the modular construction of the ZA model range, an optimum machine configuration is possible, which can be adapted to various customer-specific requirements. These are among others the selection of various sizes of waste water and process water tanks, cooling systems, additional process water pumps, dosing systems etc.



Functional sketch of a peeling centrifuge



Peeling centrifuge ZA 04 with cooling system

	ZA 04	ZA 06
Capacity (l/h)	1,000	2,000
Mud volume (l)	14	28
Centrifugal rating (g)	1,920	2,417
Waste water tank (l)	800	1,500
Process water tank (l)	400	1,000
Type of drive	Direct drive	V-Belt drive
Dimensions (mm) (L x B x H)	2,500 x 1,700 x 2,100	2,100 x 2,800 x 2,350
Motor power-average (kW)	3	5

Cleaning by centrifugal force

With the centrifugal filter technology solid fines are removed from the process water with a centrifugal force which is up to 2,417 times higher than the gravity of the earth. Oil and / or extremely fine solids < 1 µm can be removed by adding flocculents. The compound utilized for the finishing operation remains largely in the process water for re-use in the finishing process.



Peeling centrifuge ZA 06

Hints for practitioners

Centrifugal recycling

For centrifugal recycling flocculents are available which clean the water to an extent which is demanded by the quality of the work pieces

Application with	For iron	Non-ferrous metals	Compounds	Flocculent*
Much oil & little abrasion	Yes	Yes	DE 97, KFL	ESM
Much oil & much abrasion	Yes	Yes	DE 97, KFL	R, ESM
Little oil / emulsion & much abrasion (plastic or metal)	Yes	Yes	KS 66	R, V
Little oil / emulsion & little abrasion or only ceramic chips	Yes	Yes	KR 50, KS 66, KFL	ESM, R
Magnesium	No	Only Mg	MJ 20	No

* Flocculation gives the best results when hot air drying operations exist and / or the components contain oil

Discharging to drain

Only the selection of the right Trowal flocculents guarantees clean, clear water in compliance with legal requirements.

Machine	Flocculent	Dosing
GA / DO	LAC with F (liquid)	Automatically
RT	ESM or ESB (powder)	Manually

Mud amount of 1 kg of worn media

The volume of mud generated in a mass finishing process depends on the media consumption and the type of effluent treatment.

Treatment	Ceramic chips			Plastic chips		
	Mass (kg)	Water share (%)	Volume (L)	Mass (kg)	Water share (%)	Volume (L)
Centrifuge	1.55	35	0.95	1.8	45	1.4
Filter press -LAC-Flocculation -ESM-Flocculation	1.9	40	1.45	2.3	50	2
	2.1	40	1.6	2.5	50	2.2
Filter bag	3.1	60	2.6	4.2	70	3.9

Further application for Trowal centrifuges

Trowal centrifuges can, besides their application in mass finishing processes, also be used to remove solid fines from the following processing liquids:

- Effluent from paint rooms
- Phosphatising baths
- Coolants for machining (e.g. grinding machines)
- Recycling water in wet blasting applications
- Recycling water for lapping processes
- Process water for industrial washing machines

Customer service

The Trowal Team supports you with a widespread service program:

Expert advice, selection of the right effluent treatment system, quick support on site and maintenance service ensure that your surface finishing operation runs trouble-free without costly downtimes.

- Expert advice regarding your waste water treatment problems by our specialists
- Preparation of tailor-made plant layouts
- Chemical analysis of effluent samples in our chemical lab
- Environmentally safe disposal of your mud (only in selected countries)



