SUPERIOR
FILTRATION

PRODUCT SHEET

GRAVIFILTER – NON-PRESSURISED SCREEN FILTER

SUPERIOR FILTRATION

Our GraviFilter is a highly efficient gravity (non-pressurised) screen filter with an integral, continuous cleaning mechanism (self-cleaning).

- It removes suspended solids from water.
- It effectively removes soft, fibrous, and organic solids, and operates efficiently in process systems with higher solids loads.

The GraviFilter provides extended flow intervals with minimal operator intervention.

Applications

The GraviFilter removes macro- and micro-solids from suspension in process lines, especially where solids loads are higher and solids are soft, organic, or fibrous. Key applications include:

1. Pre-Filtration

- Membrane separation processes
- Potable water and sewage wastewater treatment
- Industrial process water treatment

2. Final Filtration

- Protecting water spray systems or equipment
  - Water spray systems
  - Dust suppression
  - Irrigation
  - Filter presses
- Equipment protection, including gland service water and measuring/metering equipment
  - Cooling water for heat exchangers
  - Removing solids from water for general-purpose plant reuse.

Industries

Industries that use water in their processes widely rely on the GraviFilter to remove macro- and micro-particles from suspension. These include:

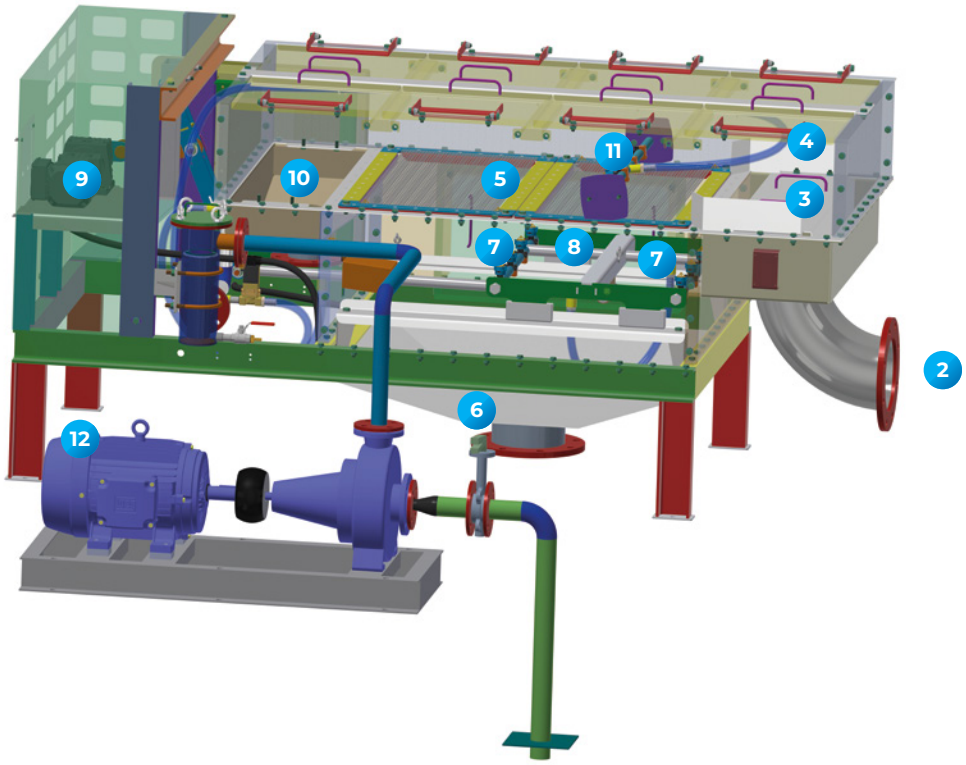
- **Industrial Process Water**
  - Agricultural and horticultural
  - Automotive
  - Brewing & distilling
  - Food & agri-processing
  - Nuclear
  - Pulp & paper
  - Power generation
  - Quarrying
  - Rubber processing
  - Textiles
- **Mining**
  - Mineral processing
  - Steel processing
  - Potable water
  - Sewage wastewater
- **Petrochemicals**
  - Refining
  - Pharmaceutical
  - Plastics
- **Oil and Gas**

Please contact us for more information

SUPERIOR FILTRATION

t: +27 11 789 4110 **t:** +44 20 4585 0337
e: info@superior-filtration.com
w: www.superior-filtration.com
Johannesburg | Cape Town | London

SUPERIOR FILTRATION



How it Works

The GraviFilter consists of:

- Flow control
- Inlet and balancing sections
- Filtration screen and clean water sump
- Self-cleaning mechanism including a high-pressure pump and drive motor
- Waste sump

You achieve flow control through a control valve or a dedicated feed pump. You can implement controls to activate and deactivate the filter based on the availability of dirty water or the level of the clean water sump.

Dirty water is introduced to the GraviFilter via the inlet 2. The baffle plate 3 calms the water as it enters the balancing chamber 4 and evenly distributes it across the width of the screens.

Water flows onto the screens and falls under gravity into the clean water sump underneath the screens 5. From the clean water sump 6, the filtrate flows under gravity into a reservoir, from where it is distributed to the service area(s). The screens retain solids that exceed the screen apertures.

Reciprocating spray nozzles 7, mounted on a trolley 8 below the screens, spray upwards. A small electrical motor and gearbox 9 or a pneumatic cylinder activate the reciprocal movement of the nozzles.

The spray nozzles continuously receive clean, filtered water, typically drawn from the filtrate reservoir and delivered by a high-pressure pump 12 or the central system pumps. The nozzles spray upward through the screens, lifting the retained solids back into the path of the forward-flowing water.

Top spray nozzles, mounted on a bar 11 spanning the width of the screens, periodically blast any remaining solids into the waste sump 10. The high-pressure pump 12 that supplies the reciprocating spray nozzles 7 also supplies the top spray nozzles. A solenoid valve controls the flow to the top spray nozzles, and you can set the duration and frequency of the pulses.

The actions of the reciprocating spray nozzles 7, in conjunction with the top spray nozzles 11, form an integral, continuous cleaning mechanism. Reusing filtered water to feed this cleaning mechanism minimises water loss.

Gravity filtration prevents permanent blockage or damage to the screens. The unforced filtration process also preserves flocculated particles and organic matter, avoiding break-up during filtration.

t: +27 11 789 4110 t: +44 20 4585 0337
e: info@superior-filtration.com
w: www.superior-filtration.com
Johannesburg | Cape Town | London

SUPERIOR FILTRATION

CASE STUDY

GRAVIFILTER: SELF-CLEANING NON-PRESSURISED SCREEN FILTER

SEWAGE WASTEWATER TREATMENT PLANT – BORCHERD'S QUARRY

Client:	Zana Manzi Services (Pty) Ltd. for City of Cape Town
Industry:	Sewage Wastewater
Region:	Western Cape, South Africa
Product:	GraviFilter – 1 x VA4, 125m³/h
Installation:	2026

Challenge

- At Borcherd's Quarry Wastewater Treatment Plant in Cape Town, in-line pressurised filters protected the spray nozzles on the dewatering presses from blocking.
- The pressurised filter struggled with periodic high solids loads in the clarifier overflow and with the nature of the suspended solids (soft, fibrous, organic). During plant stress, the filter was prone to blockages, requiring frequent maintenance.
- Downtime and equipment failures disrupted operations.
- The City of Cape Town required an effective filter that could handle periodic elevated suspended solids levels and was fit for purpose to process soft, fibrous, and /or organic solids, significantly reducing system downtime and maintenance.

Application

- Final filtration/spray nozzle protection

Solution

- The client initially requested more in-line pressure filters to increase throughput volume and improve water quality.
- After consulting with Superior Filtration sales engineers, we agreed to trial a different technology instead.
- The GraviFilter is a non-pressurised screen filter with an integral self-cleaning mechanism.
- It is designed specifically to process the types of suspended solids encountered at sewage WWTPs (soft, fibrous, organic).
- The gentle, unforced filtration action avoids pushing suspended solids into the mesh openings, avoiding screen blinding.
- Superior Filtration supplied a GraviFilter on a trial basis. If the trial succeeded, the client would retain the filter and pay full price. If it failed, Superior Filtration would take the filter back at no cost to the client.
- Installed 1 x VA4 GraviFilter with an integral, self-cleaning mechanism, with a processing capacity of 125 m³/h at 250µm.

Results

- Following the installation, the client reported a significant decrease in downtime.
- The GraviFilter easily filters dirty water during periods of plant stress and also filters the soft, fibrous, and organic solids effectively. Less downtime to clean/unblock filter screens ensures reliable feed of clean water to the nozzles and other plant applications.
- Significantly reduces day-to-day maintenance and downtime.
- In challenging and variable conditions, the GraviFilter plays a critical role in supplying the plant with clean process water.

t: +27 11 789 4110 **t:** +44 20 4585 0337
e: info@superior-filtration.com
w: www.superior-filtration.com
Johannesburg | Cape Town | London

SUPERIOR FILTRATION

CASE STUDY

GRAVIFILTER: SELF-CLEANING NON-PRESSURISED SCREEN FILTER

SEWAGE WASTEWATER TREATMENT PLANT – BORCHERD'S QUARRY

Client:	Zana Manzi Services (Pty) Ltd. for City of Cape Town
Industry:	Sewage Wastewater
Region:	Western Cape, South Africa
Product:	GraviFilter – 1 x VA4, 125m³/h
Installation:	2026

Client experience

"The process plant is performing at an optimal level, with very little downtime due to nozzle blockages. Washed product also exits the plant in a cleaner condition (a direct result of nozzles not becoming blocked or partially blocked)."

"Maintenance has been reduced by at least 80–90%, with no more morning downtime or production delays."

"The client (City of Cape Town) is very pleased with the GraviFilter; they utilise roughly 60% of the daily filtered water in other process areas, with a definite increase in the availability of clean water and less downtime in their process areas. Ultimately, a win-win situation for all parties involved."

Willem Tredoux: Area Manager – Western Cape – WSSA (Pty) Ltd

Please contact us for more information

SUPERIOR FILTRATION

t: +27 11 789 4110 **t:** +44 20 4585 0337
e: info@superior-filtration.com
w: www.superior-filtration.com
Johannesburg | **Cape Town** | **London**

SUPERIOR FILTRATION

CASE STUDY

GRAVIFILTER: NON- PRESSURISED SCREEN FILTER

FINAL FILTRATION, GLAND SERVICE WATER, DRDGOLD FAR WEST GOLD RECOVERIES

Client: CURO Pumps for DRDGOLD
Industry: Mining and Mineral Processing
Region: Carletonville, Gauteng, South Africa
Product: GraviFilter, Model VA4, ±100 m3/hr
Installation: October 2023

Challenge

- DRDGold's Far West Gold Recoveries treats reclaimed material f rom tailings dams. As part of the process, water from the tailings dam flows into the process water dam where suspended solids are allowed to settle. Supernatant f rom the process water dam is re-used in general mining applications, including as Gland Service Water (GSW) for slurry pumps. Poor quality of the supernatant (high levels of suspended solids, TSS) causes damage to equipment. Specifically, dirty GSW will reduce the life of the gland service water pump (multistage pump), the slurry pump stuffing box components and gland packing
- At Far West Gold Recoveries, the client noticed excessive sliming on the pumps combined with higher-than-expected pump maintenance costs and frequent breakdowns. A solution was required to reduce TSS in the supernatant to drastically reduce maintenance costs and breakdown frequency.

Application

- Final Filtration / **Filtration of Gland Service Water** to protect gland service water pumps and slurry pumps.

Solution

- Following on the successful use of GraviFilters at Harmony Gold on the same application (four GraviFilters in operation at Harmony Gold on GSW), DRDGold decided to install a GraviFilter to reduce TSS on the process water line
- GraviFilters are non-pressurised screen filters with an integral (self) cleaning mechanism. This allows for long uninterrupted filter runs without any manpower requirements
- GraviFilters are versatile and are excellent at handling different types of solids. It is ideal for removal of soft-, organic- or fibrous suspended solids and is equally effective in removal of hard scale and sand. Depending on the nature of the solids, GraviFilters can achieve filtration down to 50µm and irregular – or oversized solids is easily processed
- 1 x **VA4 GraviFilter was installed with a processing capacity of 100m3/h @ 250µm**.

Results

- After installing the GraviFilter, the client reports a **significant decrease in breakdowns**. Fitters and other maintenance personnel are freed up to focus on other areas.

Client experience

"After installing the GraviFilter, we noticed a significant decrease in pump breakdowns.

The pumps ran for over three months before replacing the packing, and as a result, the spares consumption was reduced. Before installing the GraviFilter, they replaced the liners every two to three weeks. Now, they replace liners every 6 to 8 months, if need be."

This has freed up the mechanical fitter to give more attention to maintaining other sites."

JP Schoeman, Senior Sales Engineer – Pump and Process Equipment – Weir Minerals Agent

t: +27 11 789 4110 t: +44 20 4585 0337
e: info@superior-filtration.com
w: www.superior-filtration.com
Johannesburg | Cape Town | London