HAGER+ELSÄSSER

An aquarion Group Company

Toveko Continuous Gravity-Flow Filters

Toveko Continuous Gravity-flow sand filters:

- Continuously monitor head loss across the filter bed*
- Continuously wash dirty sand whilst the filter is in service
- Have a highly efficient sand washer that copes with sticky solids including oil and polyelectrolyte
- Consume very little wash water
- Do not require large tanks, supply pumps etc. for backwashing
- Do not require large dirty backwash water collection and pumping systems
- Start stop and control the sand washing rate automatically*
- Have a low profile (2.3m maximum for steel filters)
- Allow gravity feed, eliminating expensive pumping systems
- Are pre-assembled and tested, allowing rapid site installation and start-up

*except for the “Mini” model, CX-25

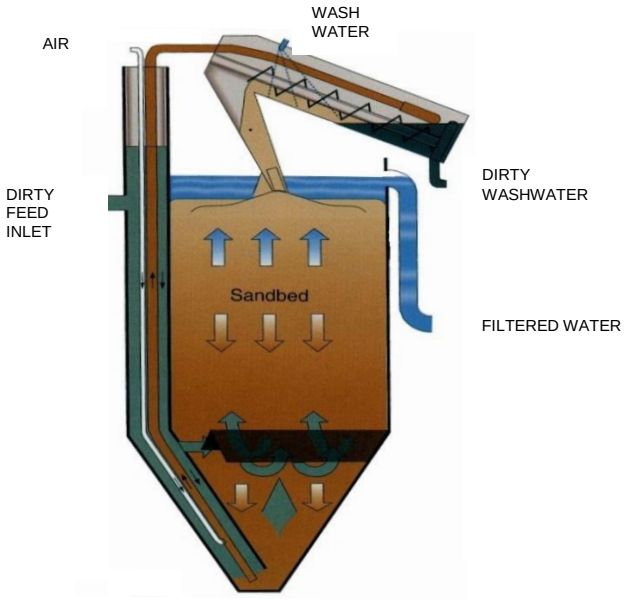
Operation

Incoming water flows into a longitudinal inlet shaft and is distributed evenly across the filter bed by inverted V-notch openings along the length of the filter. The inlet shaft is taller than the main filter body and this provides the 650mm of available head across the filter bed.

Solids are filtered from the water and the clean water overflows above the filter bed via V-notch openings.

TOVEKO filters continuously clean the filter bed whilst in service. An airlift pump transfers dirty sand from the base of the bed into an inclined, traversing screw-type washer located above the filter bed.
Inside the washer, the individual grains of filter sand rub against each other in a counter-flowing stream of wash water. This vigorous action makes the sand washer highly efficient, enabling it to handle sticky solids that defeat other gravity-flow sand filters.

During normal operation, the filter stops and starts automatically as the incoming flow stops and starts. In periods of high flow and/or high solids load, the rate of sand washing automatically increases when necessary to ensure that the filter bed remains clean at all times. This makes TOVEKO filters largely self-compensating and suitable for remote sites.



Performance

		SS	BOD_5	P_{tot}
Sewage Tertiary treatment	in	20	30	5
	out	2.3	2	0.09

		SS	Oil	COD	BOD5
Oily wastewater	in	7-110	37-200	110-590	5-75
	out	1-16	4-100	55-145	1.5-13

		SS	Zn	Cr	Tot. metals
Industrial tertiary treatment	in	35	11	5	16
	out	<5	0.18	0.5	0.68

		Pb	Cu	Cr	Ni	Zn	Hydrocarbons
Laundry wastewater	in	0.35	0.93	0.12	0.25	3.8	14
	out	0.01	0.1	0.006	0.03	0.3	7.3

		SS
River water filtration	in	50
	out	<5

Filter Range, Characteristics and Dimensions

Filters are available general characteristics and overall dimensions as shown below

	CX-25	S-75	S-150	S-300	S-450	S-600	T-900	T-1200
Filter Bed Surface Area (m^2)	0.25	0.75	1.5	3.0	4.5	6.0	9.0	12.0
Typical capacity for wastewater (m^3/h)	2.5	7.5	15	30	45	60	90	120
Installed power (kW)	0.18	0.36	0.36	0.54	0.72	0.9	1.44	1.8
Max. compressed air consumption (Nl/min)	30	30	50	100	150	200	300	400
Wash water consumption (l/min)	2-5	3-6	5-10	10-20	15-30	20-40	30-60	40-80
Weight empty (kg)	200	350	600	1150	1700	2200	3100	4000
Approx. operating weight (kg)	700	1850	3700	7200	10700	14200	21100	28000

	CX-25	S-75	S-150	S-300	S-450	S-600	T-900	T-1200
Overall height (mm)	2020				2300			
Overall depth front-to back, incl. washer (mm)	1240			1350			2700	
Filter body length (mm)	695	1300	2300	4300	6300	8300	6300	8300

Examples of installations

T-1200 and S-600 filters

On a tertiary filtration duty prior to discharge to a river

S-300 filter

In a dry well for sewage tertiary filtration

Skid-mounted S-300 filter

For emergency response duty for a UK water company

S-600 filter

Installed in a nominal 3m high enclosure for sewage tertiary filtration

Sand Washer top view
showing wash water entering

Filter bed top view
showing filtered water overflow

CX-25 “Mini” filter

The smallest TOVEKO filter, the CX-25, or “Mini” has been developed for very small applications where a simple, low-cost filter is required. Its washer is static, and certain features of the larger model, for example the automatic head-loss detection is omitted.

Commonly this filter is used for sewage tertiary filtration for packaged sewage treatment plants or very small industrial applications.

Testing and Pre-commissioning requirements

All TOVEKO filters are pre-assembled and tested in the factory before shipping. This minimises the time work and time required on site. They require a flat, level concrete plinth, connection of power, compressed air and wash water plus inlet and outlet pipework. They are then ready for start-up and commissioning that, for single filters, can be done in as little as one day. Normally, the commissioning engineer also trains the client’s staff in correct operation and maintenance.

Long-term support

Our team of engineers is always available to provide support, troubleshooting and the occasional spare part throughout the life of the filter. When appropriate, (for example for large installations) service and maintenance packages are provided.

H+E ranks among the world's leading suppliers in the fields of: water & wastewater treatment, and energy efficiency. Based on its global presence, the **H+E GROUP** has completed projects in over 50 countries.

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