

TETRA™ DeepBed™ Filter

Wastewater Treatment Processes DeepBed™ Filters

Tertiary Treatment of Wastewater Treatment Effluent

The De Nora TETRA™ DeepBed™ Filter is a down flow sand filter for the filtration of effluent from municipal wastewater treatment plants.

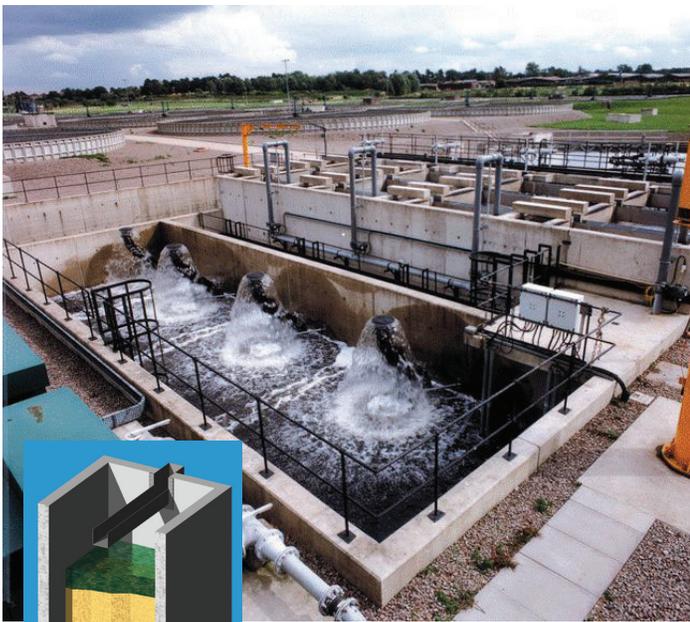
Even at high solids loadings and maximum design flows excellent solids capture rate is achieved. The high efficiency backwash

process achieves excellent solids release after a single operation with virtually no media loss.

Filter Structure

The TETRA™ DeepBed Filter technology is built on the TETRA™ SNAP T® Block floor. As well as offering excellent distribution of backwash air and water, it also supports the weight of 450 mm of reverse graded gravels and 1.2 or 1.8 m of filter media.

There are no nozzles or moving parts in the filter cell. The air header and laterals are constructed from stainless steel and are located out of contact with the media and gravel layers.



Media Matters

The design of the TETRA™ DeepBed™ filter and special sand media enable solids to penetrate deep into the sand bed avoiding surface blinding.

This provides the filter with a greater solids holding capacity which means the run times between backwashes are longer and hence the volume of backwash water generated is less.

Media Specification

Effective Size:	2 - 3 mm
Sphericity Factor:	0.8 – 0.9
Specific Gravity:	2.65
MOH Scale Hardness:	6-7
Uniformity Coefficient:	1.3

Process Control

TETRA™ filtration systems are fully automatic, but allow considerable variation timing to service all considerations.

The user interface screen provides complete process monitoring of the filter plant, allowing the operator to interact with all phases of the process, plus the ability to manually control a backwash.

The system allows detailed on-screen operational data change, if required, and continuous monitoring for alarm conditions.

Replacement Filters

Old rapid gravity tertiary filters can be converted into modern, robust DeepBed™ Filters achieving high quality effluents - thanks to the unique features of the TETRA™ DeepBed™ Filtration Systems.

TETRA™ filters can be easily retrofitted into the shells of 'outdated' filters and it is often possible to re-use existing plant equipment such as sludge well, clearwell, pipework, valves, air blowers and pumps.

This option can offer substantial savings on capital costs, especially when combined with the operational cost savings of the TETRA™ process.



Filter Backwash Sequence

The TETRA™ Backwash System achieves effective cleaning of the filter bed without media loss or high backwash water recycle rates - leading to substantial savings in operating, running and maintenance costs and reducing the potential for plant downtime.

Effective media cleaning is achieved by the backwash sequence depicted on the right. The backwash sequence is usually initiated on a time basis and contains the following steps:

Air Scour

A high air rate is distributed evenly across the filter bottom to break up and large solid mass within the filters.

Concurrent Air and Water

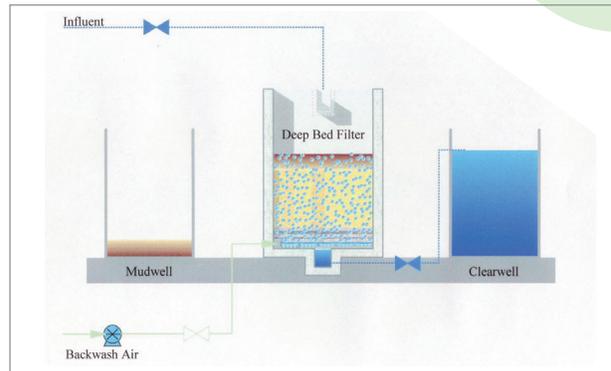
Backwash water is introduced across the filter floor to raise the released solids to the effluent launder. The dual air/water backwash action provides intense washing energy throughout the media bed.

Final Water Flush

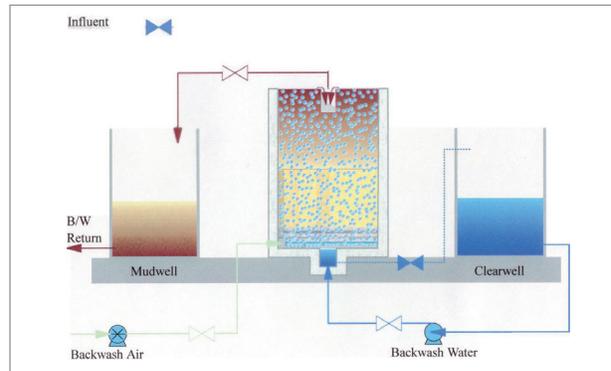
A final flush of water only is used to remove any entrained air from the filter bed.

The backwash sequence is typically around 5 minutes air scour, 20 minutes combined air/water and then 5 minutes water flush with the total water consumed usually between 2 and 5% of plant throughput. Even though the backwash is intense the media is not fluidized and media loss is virtually zero.

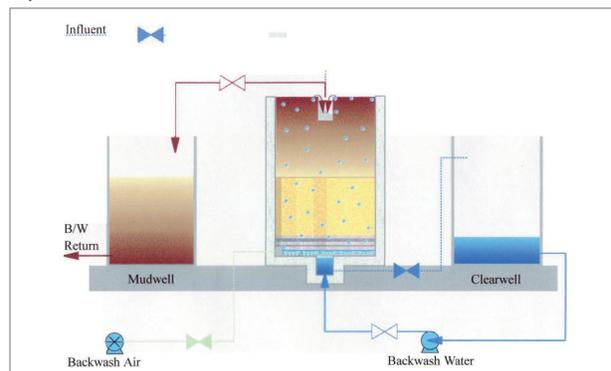
1) Backwash - Air Scour Only



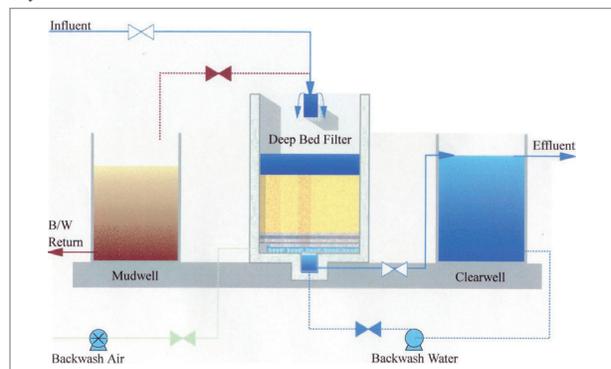
2) Backwash - Concurrent Air and Water



3) Backwash - Final Filter Flush



4) Backwashed Filter Returned to Service



TETRA™ DeepBed™ Filter

Other Members of the DeepBed™ Filter Family

TETRA™ DeepBed™ Filters are available/upgradable to TETRA™ Denite® denitrification technology, with an added carbon source that enables removal of nitrate and solids in one operation.

Modular DeepBed™ Filters for smaller works and steel/GRP tank construction are available.

Other products available based on the same technology are the TETRA™ SAF and NSAF (Nitrifying Submerged Aerated Filter).

The TETRA™ SAF is a submerged aerated media process for the biological oxidation of municipal and industrial wastewaters. A robust, small footprint system, it can be used for either secondary treatment or as a tertiary (nitrification) stage.

When combined with primary and final settlement SAF offers complete effluent treatment. The TETRA™ SAF is available in a range of sizes from small modular units suitable for above or below ground construction up to large bespoke design plants.



TETRA™ MDBF (Modular DeepBed™ Filter)



Combined TETRA™ NSAF and DeepBed™ Filter Plant

WATER MADE EASY

MARINE

ENERGY

MUNICIPAL

INDUSTRIAL



DE NORA
our research - your future

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