

Continuous sand filtration with air addition to facilitate removal of ammonia from wastewater

DynaSand® Oxy delivers ammonia, TSS and BOD removal in a single stage for tertiary treatment of final effluent discharge from sewage and industrial wastewater treatment plants.

Primarily designed for ammonia removal, for which it delivers removals down to 2 mg/l, the DynaSand® Oxy can also provide removals of effluent phosphorus down to 0.2 mg/l as well as effluent BOD and TSS down to 10 mg/l.

As the water flows upwards through the filter bed, ammonia is converted into nitrate by bacteria - Nitrosomonas and Nitrobacter - which form a layer on the surfaces of the filter grains. The bacteria, which are autotrophic and thus live only on inorganic materials, utilise carbon dioxide for biomass growth.

As with the standard DynaSand®, aluminium or ferric salts can be injected directly into the inlet stream to facilitate precipitation of phosphates.



Performance

Feature	Removals
Effluent TSS removal	Down to 10 mg/l *
Effluent BOD removal	Down to 10 mg/l *
Effluent Phosphorus removal (with upgrade option to include metal salts dosing)	Down to 0.2 mg/l**
Effluent Ammonia removal	Down to 2 mg/l *
Maximum flow-rate per filter	29 l/s

* effluent standards quoted to 95%ile

** annual average

Applications

- Wastewater treatment works.
- Industrial effluent treatment.

Benefits

Continuous process based on the DynaSand® system with the addition of nitrate removal.

Ammonia, suspended solids and BOD removal in a single stage.

Can be upgraded to enable phosphorus removal down to 0.2 mg/l (annual average).

Peak inlet concentrations handled.

Efficient, easy operation.

Stand alone addition to the works.

How it works

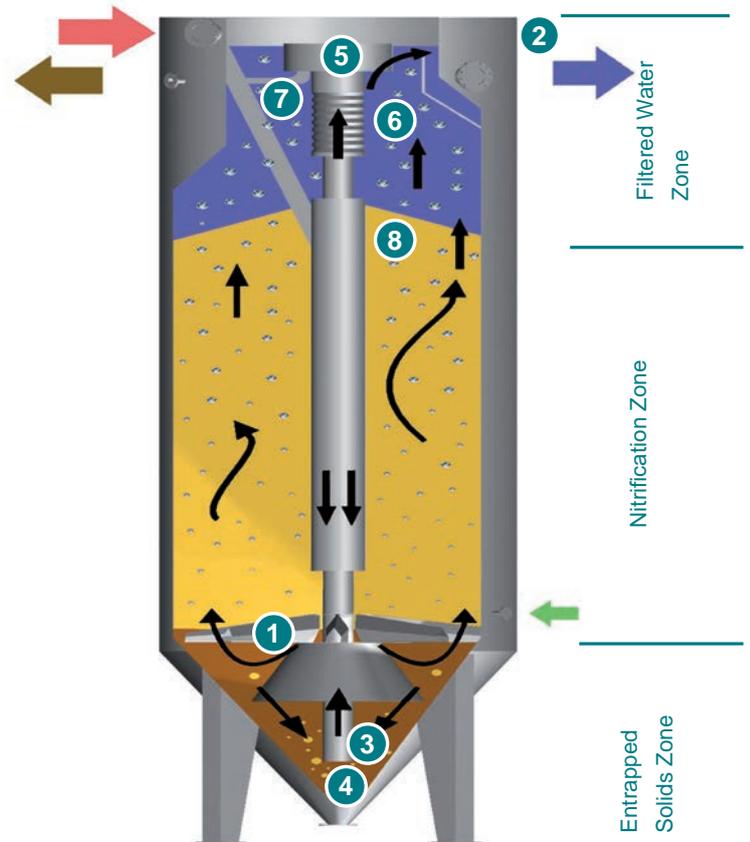
The water to be treated (red arrow) is admitted through the inlet distributor (1) in the lower section of the unit and is cleaned as it flows upwards through the media bed, prior to discharge (blue arrow) through the filtrate outlet (2) at the top.

To ensure that the autotrophic nitrifying bacteria have sufficient oxygen and carbon dioxide to convert ammonia to nitrates, aeration hoods fed by process air (green arrow) are sited within the upper layer of media to provide sufficient aeration. The resultant nitrates remain dissolved in the water.

The media containing the entrapped solids is conveyed from the tapered bottom section of the unit (3), by means of an airlift pump (4), to the media washer (5) at the top.

Cleaning of the media commences in the pump itself where impurities are separated from the media grains by the turbulent mixing action. The contaminated media spills from the pump outlet into the washer labyrinth (6) in which it is washed by a small counter current flow of clean water. The separated solids and sloughed biomass (brown arrow) are discharged through the wash water outlet (7), while the grains of clean media (which are heavier) are returned to the media bed (8). As a result, the bed is in slow, constant downward motion through the unit. Compressed air for the air lift pump is provided via the air distribution panel.

Thus, water purification and media washing both take place continuously enabling the filter to remain in service without interruption.



Learn more

To learn more about how DynaSand® Oxy can help you improve ammonia removals visit hydro-int.com, search DynaSand Oxy online or contact us:

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