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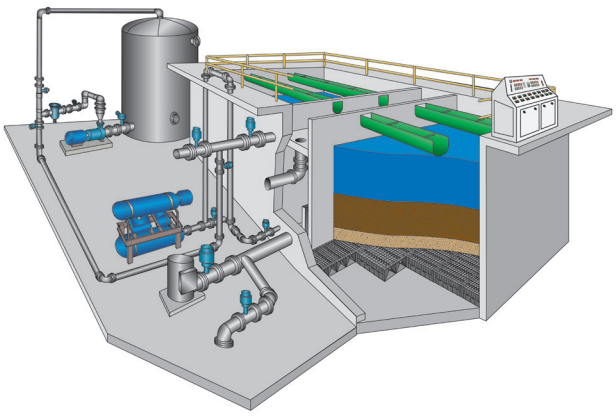
Let's Solve Water

Leopold® elimi-NITE® 2.0 Denitrification System

THE NEXT GENERATION IN NUTRIENT REMOVAL



The Leopold elimi-NITE 2.0 denitrification system reduces nitrogen in the effluent stream of a wastewater treatment plant by converting nitrate nitrogen to nitrogen gas.

The biological conversion is done in an attached growth, downflow, deep bed, mono-media filter. Particulate matter is removed so insoluble phosphorus is removed as well. Since free oxygen will inhibit the activity of the denitrifying process, dissolved oxygen is biologically removed first, thereby creating an anoxic environment for denitrification. The system adds the supplemental carbon source or microbiological food needed to metabolize the nitrogen, since the preceding wastewater treatment processes have removed nearly all of the degradable carbonaceous material from the wastewater.

To ensure effective nutrient removal, the elimi-NITE 2.0 system features:

- Feedback control of the carbon source
- Several types of water level control
- Media optimization
- Backwash optimization
- Run time optimization

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Feedback control of the carbon source

The system's carbon source can be fed on a mass basis using the filter influent flow rate and nitrate concentration or using feed-forward control. Another control loop measuring the filter effluent nitrate concentration can be used in a feedback control system. The elimi-NITE 2.0 system offers feed-forward control coupled with feedback control to provide optimal use of methanol that can surpass a feed-forward-only control scheme. The elimi-NITE 2.0 methanol consumption can be near 100% of theoretical values and generally doesn't exceed 110% of overall consumption.

As an added benefit, the feedback portion of the unique elimi-NITE 2.0 control algorithm can achieve and control effluent nitrate concentration at a desired set-point under variable hydraulic and nitrate influent loads. In other words, a desired effluent nitrate concentration can be set and held.

The Leopold Type S underdrain with I.M.S® 1000 media retainer provides superior air and water distribution and retention of monomedia sand particles greater than 1.7 mm.

Several types of level control

Constant water level control affords the least amount of dissolved oxygen gain in the feed-water by avoiding splashing of the influent flow. This lowers the overall amount of carbon source needed to achieve process goals. Variable level control, which typically increases the overall methanol usage due to influent splash, can result in somewhat longer filter run times.

The elimi-NITE 2.0 system can use variable or constant water level control; the selection is determined by contaminant loadings and media selection.

Media optimization

After more than two decades of experience, Leopold has the expertise to select the proper media for the process application and to balance regulatory requirements with filter performance to meet treatment goals.

Furthermore, the I.M.S® 1000 precision-slotted media retainer can replace up to 14" (35 cm) of support gravel to allow additional media depth or increased filter freeboard. This results in improved air and water backwashing and cleaner media for longer filter runs.

Backwash optimization

Since media fluidization is not necessary, the filter can use very low backwash rates, sometimes as low as 6 gpm/ft^2 (15 m/h). Air scour rates to augment the backwash cycle can be as low as 5 SCFM/ft^2 (91 m/h).

Run time optimization

Depending on overall system design, run times can approach 100% of theoretical filter bed loading limits.

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