

## Lagoon MBBR

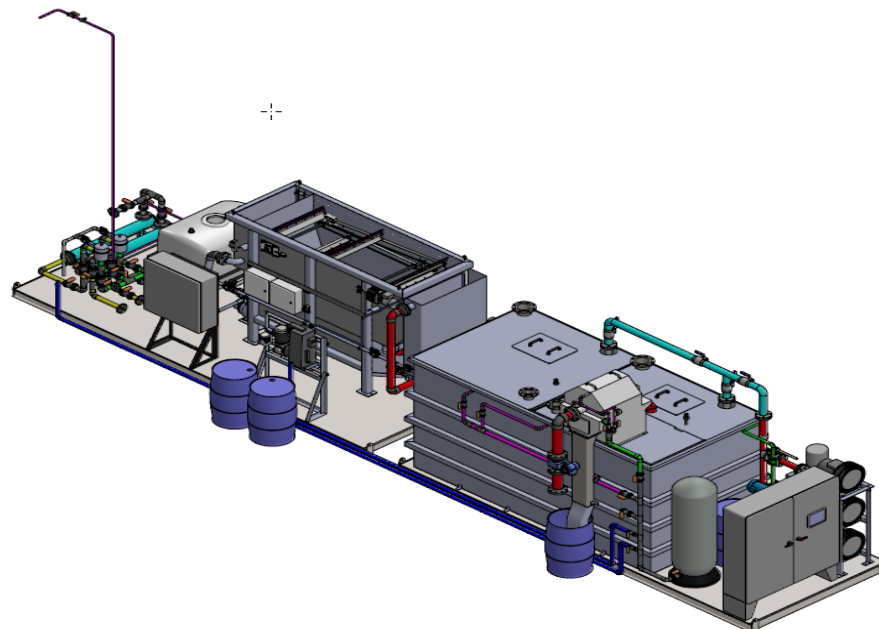
### Lagoon system overview

- There are two different types of lagoons treatment processes, one known anaerobic lagoon and one aerated or aerobic lagoon.
- Anaerobic systems are typically comprised of several shallow ponds of 4-6 feet deep and have a typical retention time of 180 days.
- The aerated lagoons are typically deeper 8-20 feet deep and have a retention time of 20-40 days. They typically have 1-4 aeration cells.



Source: Parkson.com

HIT CS50 SYSTEM



### Requirement for lagoon treatment Upgrades

- As per the clean water act new stringent rules were issued for discharge levels of concentration of ammonia, nitrite+ nitrate and total nitrogen in the wastewater. Most of the lagoons cannot meet these requirements and so to meet this requirement new infrastructure must be provided.
- Nitrification is an economical and sustainable method for removal off ammonia however it is conventionally sensitive to low temperatures with nitrification ceasing below 8<sup>0</sup>C.
- In many regions during winter temperature reaches below 1<sup>0</sup>C . At this temperature nitrification does not take place and as lagoon cannot maintain a higher temperature, nitrification does not take place in lagoons and ammonia is not reduced.



## Headworks BIO Lagoon MBBR Technology

### The technology has following characteristics:

- Nitrogen removal by anoxic biological MBBR process.
- Nitrogen gas formation.
- Denitrification occurs in anoxic zone ( nitrates/nitrites converted to nitrogen gas).
- Nitrification occurs in aerated zone of mbbf ( ammonia converted to nitrates).
- Conversion of Ammonia to nitrates to nitrogen gas in a single reactor.

### Advantages:

- **Smaller Footprint**- Allows for expansion/upgrade without additional infrastructure.
- **Low Maintenance**- Self regulating process automatically responds to fluctuations in organic loads, without the need for operational adjustments.
- **Expandable** - The IFAS process allows gradual, multi-step, plant expansion, due to the progressive addition of media.
- **Durability**- The main component of the biological system is the media. The ActiveCell media does not need to be changed for 20 years.

The MBBR technology used by Headworks BIO is an integrated Treatment systems with specially designed ActiveCell media for biofilm growth.

The media grows biofilm on the internal surface thereby protecting it from temperature shocks due to drastic drop of temperatures.

The MBBR maintains and regulates temperature so that the nitrification/denitrification steps are not affected.

The ActiveCell process employs the benefits of fixed-film systems into the suspended growth activated sludge process. This hybrid process is referred to as Integrated Fixed-film Activated Sludge (IFAS) technology.

The IFAS process enables quantitative nitrification even at a low sludge age of the activated sludge by maintaining a separate population on the media.

As Nitrification occurs in the IFAS system at low suspended-sludge age, it results in better sludge settling properties.

To learn more about Lagoon upgrade, contact: Headworks BIO Inc. +1.713.647.6667 [HWBIO@headworksintl.com](mailto:HWBIO@headworksintl.com)

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