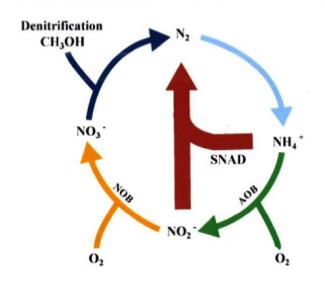




#### Information

To minimize the footprint of biological nitrogen removal process, a patented advanced control system, Simultaneous Partial Nitrification, Anaerobic ammonium oxidation and Denitrification (SNAD) is capable of treating N-rich streams with low COD in single reactor, contribute even more to a sustainable wastewater treatment.



### **Principle**

Conventional nitrification and denitrification process needs an amount of biodegradable and inorganic carbonate source. High consumption is another disadvantage of this process. Therefore, the concept of nitrogen removal model has been changed since the confirmation of the anaerobic ammonium oxidation (Anammox) process. The Anammox process, which is an autotrophic oxidation process converts ammonia to N<sub>2</sub> using nitrite and leave 10% of nitrate.

In order to meet stringent TN effluent standards, a combination of ANAMMOX and denitrification in the same reactor would fit the requirements.

$$\underline{1}NH_{4}^{+} + \underline{1.32}NO_{2} + 0.066HCO_{3} + 0.13H^{+} \rightarrow$$

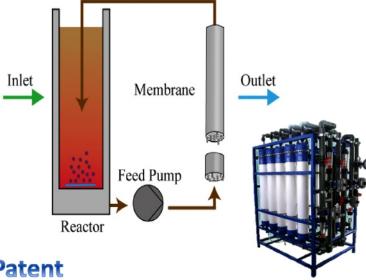
$$\underline{1.02}N_{2} + 0.26NO_{3} + 0.066CH_{2}O_{0.5}N_{0.15} + 2.03H_{2}O$$





## **Key features**

Suitable for wastewater with high ammonia concentration, 500mg/l above, and without any organic carbon source

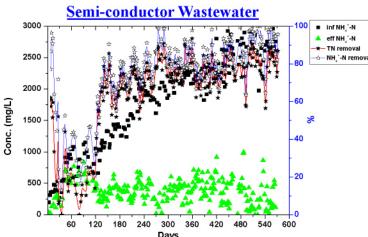


#### **Patent**

This cutting-edge technology has received the United States, China and Taiwan patent award.







TN removal

#### Design

- Small footprint
- Easily upgrade for future and existing plants
- Versatile range of use

### **Operator-friendly**

- Simple & safe maintenance
- Cost-effective
- Easy start-up with seeding

#### **Environment-friendly**

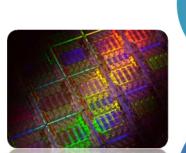
- Low energy consumption
- Less reducing agent
- 20% less GHG emissions

Leaderman & Associates offers you a good economic and operative perspective by integrating SNAD process with MBR system.



# **Applications**

The most important aspects of concern system choice and operation of combined Anammox process is able to tolerate versatile range of wastewater.



Semi-Conductor industry wastewater

Leachate treatment plants

> Optoelectronic Wastewater



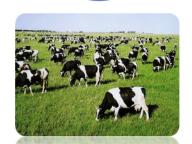
Sidestream from Anaerobic digestion

> Wastewaters from livestock farming

Industrial









## References





♣ Keelung Landfill leachate treatment plant :Flow rate: 350 CMD ,Nitrogen Loading: 180 kg-N/d



♣ Bali landfill leachate treatment plant: Flow rate: 800 CMD ,Nitrogen Loading: 480 kg-N/d

## From small to large installations

SNAD process can be applied in main stream or side stream of wastewater treatment plant. It is a great solution as a pretreatment of high strength ammonia wastewater. With 80% of total nitrogen removal efficiency, patented SNAD process offers you a sustainable and cost-effective alternative way to treat high strength ammonia wastewater.

## Leaderman & Associates Co., Ltd