



HYBACS DEMONSTRATION PLANT

PRINCETON MEADOWS, N.J.
UNITED WATER

INFILCO
BIOLOGICAL GROUP



HYBACS

HYBRID ACTIVATED SLUDGE SYSTEM

DEMONSTRATION PLANT, UNITED WATER
PRINCETON MEADOWS, N.J.

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QUICK FACTS:

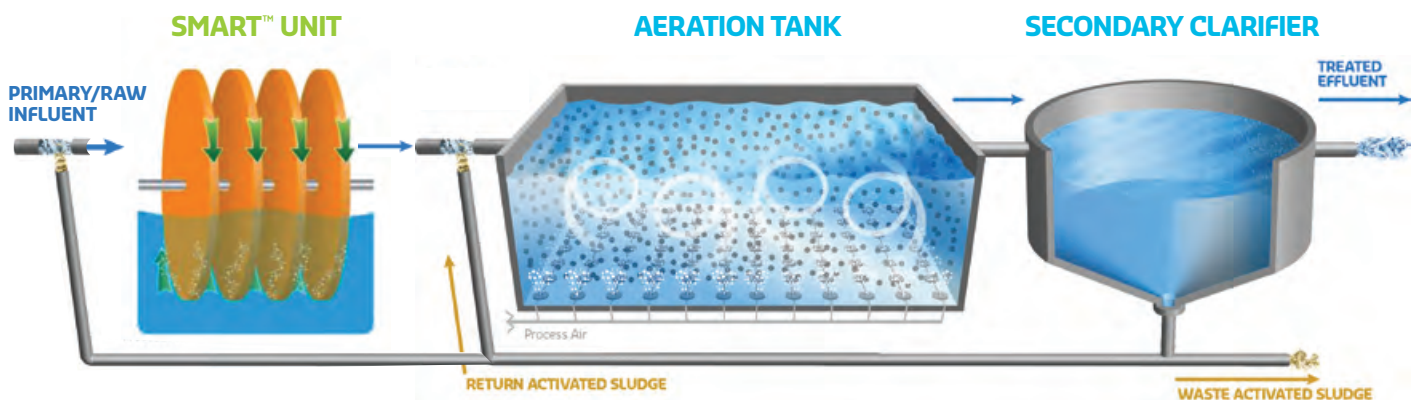
- > **40% REDUCTION IN ENERGY CONSUMPTION**
- > **REDUCED CAPEX UP TO 20% ON GREENFIELD AND UP TO 50% ON UPGRADES**
- > **SIGNIFICANT REDUCTION IN FOOT-PRINT COMPARED TO OTHER SYSTEMS**
- > **CHEMICAL SAVINGS**

BACKGROUND:

The **HYBACS** system utilizes an innovative nutrient removal hybrid activated-sludge process. The process consists of two biological stages.

1. The first stage comprises SMART™ units, with attached biomass.
2. The second stage is an activated sludge process, with suspended biomass.

SMART™ UNITS – The plates are manufactured from mesh with a porosity of 95%, which produces a biological environment containing aerobic, anoxic and anaerobic regions. This supports a large quantity of attached biomass with substantial diversity and activity, ensuring high treatment capacity.



Aeration from Rotation As the plates rotate, the biomass is aerated from the atmosphere above the water, and brought into contact with pollutants when submerged. This substantially increases the transfer rate of pollutants and oxygen to the biomass, increasing its utilization, resulting in substantial energy savings.

Optimized Aeration Tanks Because of the high efficiency of the SMART™ UNITS, the size of the downstream aeration tanks can be reduced by 50%, compared with a conventional activated sludge plant.

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SYSTEM DESIGN:

- > **FLOW:** 45 to 69 gpm
- > **INFLUENT BOD₅:** 150 mg/l
- > **INFLUENT TSS:** 138 mg/l
- > **INFLUENT NH₃-N:** 25 mg/l
- > **EFFLUENT BOD₅:** <10 mg/l
- > **EFFLUENT NH₃-N:** <3 mg/l

STUDY OBJECTIVES:

Phase I: Demonstration of Technology Performance

- COD removal
- Energy efficiency
- TN removal
- TP removal

Phase II: System Optimization

- Evaluate BOD, NH₃-N, NO₃-N and TP removal with plant raw influent (higher BOD)
- Optimize SMARTTM Unit performance at various loading rates
- Determine nitrification rate for various Solids Retention Times and dissolved oxygen values



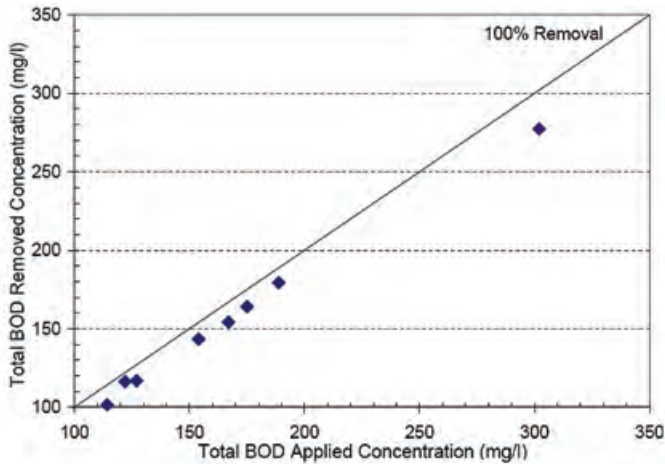
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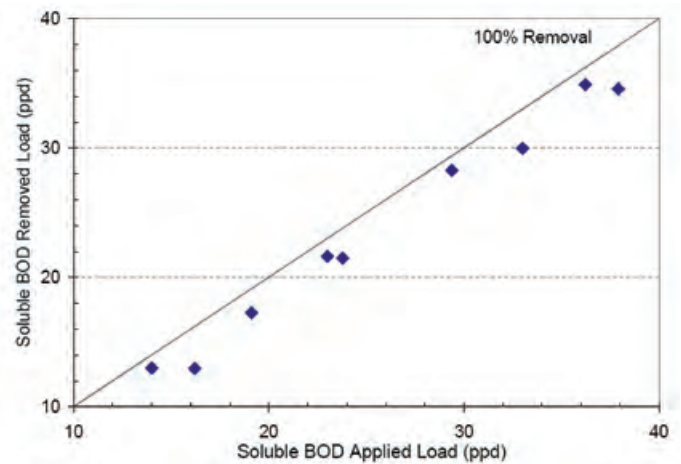
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SYSTEM PERFORMANCE:

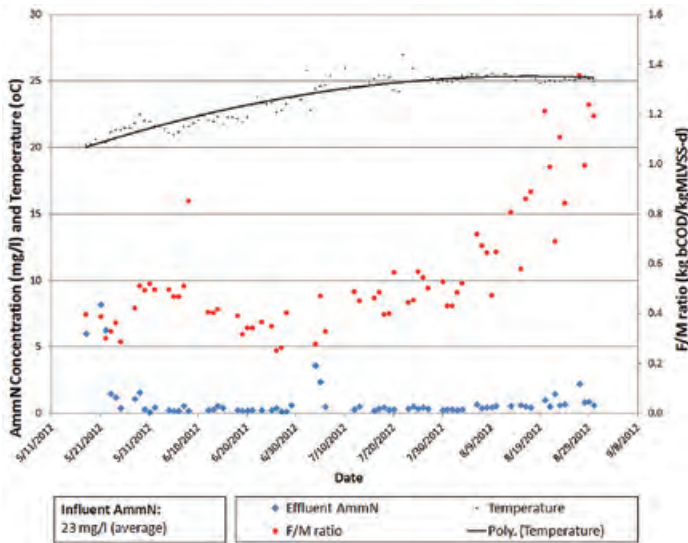
INFLUENT AND EFFLUENT TOTAL BOD



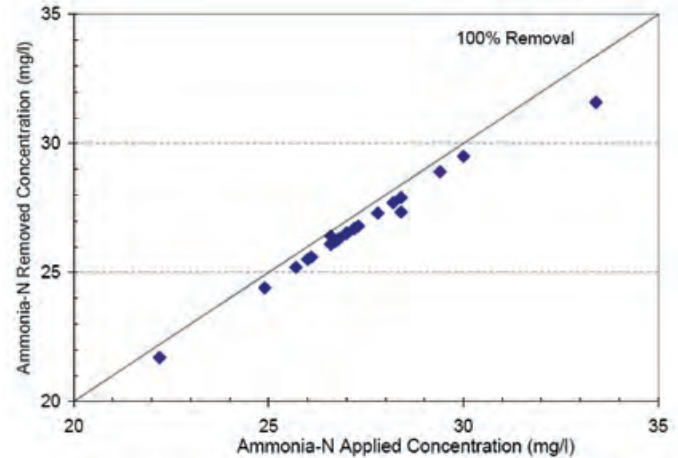
INFLUENT AND EFFLUENT SOLUBLE BOD



F/M RATIO, TEMPERATURE & EFFLUENT AMMONIA-N



INFLUENT AND EFFLUENT AMMONIA-NITROGEN



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