

MOLEAER BOOSTS HERSHEY CREAMERY DAF PERFORMANCE WITH NANOBUBBLE TECHNOLOGY

Hershey Creamery Company launched a corporate initiative to reduce their environmental footprint and increase efficiency to improve their bottom line. As part of this effort, Hershey Creamery contracted Glace Associates to conduct an independent evaluation of their wastewater treatment plant and to recommend emerging technologies to improve their overall treatment processes and reduce their operating expenses.

The wastewater challenge that most creameries face is cost-effective removal of high levels of soluble biochemical oxygen demand (BOD) associated with dairy wastewater. Ineffective or insufficient treatment can lead to costly wastewater discharge surcharges. Often, creameries employ Dissolved Air Flotation (DAF) systems to pretreat wastewater prior to discharge. As part of their audit, Glace Associates identified an opportunity to enhance the performance of Hershey's DAF through improved flotation.

Enter the Moleaer nanobubble generator, an advanced gas-injection system designed for a variety of wastewater applications. Hershey installed a Moleaer 100 gallon per minute (GPM) unit directly to the DAF without the need to remove existing equipment. The Moleaer nanobubble generator provides several benefits over traditional aeration technologies. First, the bubble size produced by the nanobubble generator is ~80 nanometers (nm) in size. This provides more than 200 times the interfacial surface area when compared to ultra-fine microbubbles. Additionally, the zeta potential of these nanobubbles has been measured at approximately -19mV. The combination of the nanobubble's larger surface area and its negative surface charge increases the attraction and collision rate with suspended particles, resulting in a higher percentage of particles attaching to the flocs and consequently being removed from the wastewater.

Client:
Hershey's Creamery Company

Type:
Dissolved Air Flotation (DAF)

Unit Type:
Moleaer 100 GPM

Installed:
June 2018

Benefits:
37% Reduction in BOD
24% TSS Removal Increase
70% Reduction in HP

Projected Annual Savings:
~\$100,000 per year

Payback:
Less than 3 months



Moleaer Nanobubble Generator installed at Hershey Creamery.



Dissolved Air Flotation tank at Hershey Creamery being skimmed after the Nanobubble Generator installation.

Once the Moleaer Nanobubble generator was installed, Hershey discontinued the use of its high-pressure dissolution system and recorded the following improvements:

- The nanobubble flotation method delivered a 37% reduction in BOD and a 24% improvement in TSS (total suspended solids) removal when compared to the existing system. As a result, the reduction in city surcharges will provide Hershey Creamery over \$50,000 in savings per year.
- The float sludge is also now more uniform and smaller in size than the original sludge and has a better consistency for pumping. Lab results showed that the percent solids in the float sludge averaged 19.8% compared to 3-4% in previous years. The increased sludge density and lower water content in the float sludge reduces hauling and disposal costs, potentially saving Hershey over \$40,000 per year.
- The nanobubble generator also provides significant energy savings when compared to the existing high-pressure dissolution system. The nanobubble generator only requires a 3-horsepower pump and less air flow. Hershey's Creamery reduced their energy consumption by over 13,470 kWh/yr (kilowatt hours per year), equating to over \$1,450 in energy savings per year.

The reduction in energy consumption combined with the reduction in surcharges from the city have created significant cost saving potential for Hershey's Creamery. In total, based on the projected BOD reduction, decrease in sludge volume and handling costs, and improvement in energy efficiency, Hershey's decision to replace their current system with nanobubble-assisted flotation could have a total projected annual cost savings of over \$100,000.

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