

TECHNOLOGY SHEET

ADVANCED DISSOLVED AIR FLOTATION (ADAF) SYSTEM

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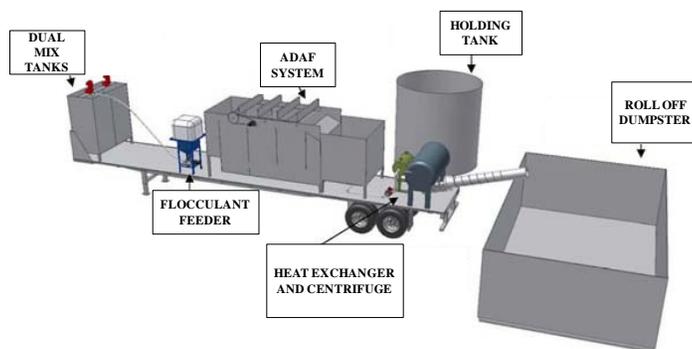


Dissolved air flotation (DAF) is a common treatment operation that has been used for a variety of industrial wastewaters for removing suspended solids (TSS), oils and greases (O&G), and biochemical oxygen demand (BOD). It is

commonly used either as a pretreatment system, for product recovery, or thickening of biological solids. Typical DAF systems consist of an inlet coagulation chamber, pressurized air injection, flotation cell with surface and bottom skimmers (or auger) and an effluent discharge chamber. Flocculants, marketed by PRD Tech, Inc. can be effectively used in DAF systems. The air injection system used in PRD Tech's Advanced Dissolved Air Flotation (ADAF) system uses a specially designed venturi to create very fine bubbles without any blowers or air compressors. Unlike typical DAF units, the Advanced Dissolved Air Flotation (ADAF) system effectively floats suspended matter to the surface utilizing less horsepower.

Treatability testing with different flocculants is essential to achieving a good design and optimum operating conditions for the ADAF system.

The entire ADAF system can be mounted on a trailer, as shown below, to allow transportation of the treatment system to the site.



Application of the ADAF system to an industrial wastewater source gave the following performance data:



The water quality from the ADAF system is excellent. In addition, the power consumption is significantly lower than conventional DAF units. The main advantages of using PRD Tech's aeration system are:

- Will not plug or foul, from material in the wastewater;
- Creates ultrafine bubbles to reduce flocculant cost by at least 75% and increase TSS removal efficiency;
- Easy to maintain and eliminates the need for compressor or blower; and
- Reduces horsepower requirement by 90% compared to a conventional DAF system.

Further, the ADAF system uses pumps for flow pressurization that can handle water with entrained air, which increases both air saturation levels and volumetric efficiency. For example, at 20°C, the maximum amount of air that can be saturated in water at 80 psig is 46% higher than the amount at 50 psig. In addition, our studies have shown that the high shear of venturitis combined with higher pressure significantly increases saturation efficiency over systems without mixing at lower pressures. This combined with efficient flocculants, makes the flocs easier to float, thus requiring less dissolved air. This allows the ADAF system to operate with much lower air:solids ratios and higher solids loading rates than typical DAF systems. Typically ADAF hydraulic loading rates range from 2.2-5.5 gpm/ft² and solids loading rates from 30-45 lb/ft².hr.

Operating Parameters	
ADAF surface area, ft ²	185
Influent flow, gpm	300
Recycle rate, gpm	14
Recycle pressure, psig	75
Air injection rate, SCFH	12
Influent TSS, mg/L	45,200
Influent COD, mg/L	102,700
Influent Oil and Grease, mg/L	19,400
Total Hydraulic Loading Rate, gpm/ft ²	2.5
Solids loading rate, lb/ft ² .hr	42.8
Treated Effluent Data (% Removals are in brackets)	
Effluent TSS, mg/L	220 (99.5%)
Effluent COD, mg/L	9,100 (91.1%)
Effluent Oil and Grease (mg/L)	70 (99.6%)

For more information and to get a water sample tested, contact Dr. Rakesh Govind, PRD Tech, Inc.
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