

DISSOLVED AIR FLOTATION TECHNOLOGY



WASTEWATER  
PRETREATMENT

BY-PRODUCT  
RECOVERY



VanAire offers a full range of equipment and technical service solutions for your DAF application. We offer both rectangular and circular DAF clarifier designs, utilizing stainless steel and non-metallic construction for long, trouble-free service.



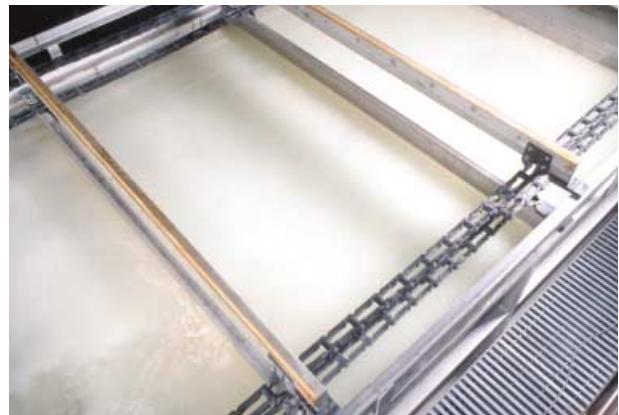
## THE LEADER The Technology Leader in Dissolved Air Flotation

VanAire's mission is providing practical, economical and technologically sound solutions for the pre-treatment of industrial wastewater and the recovery of marketable by-products.

In 1992, we introduced the next generation in Dissolved Air Flotation (DAF) technology. Using sound thermodynamic and fluids mechanics engineering principles, this technology continues to be the basis of the most advanced and efficient DAF products on the market today.

Our principles are simple. First, we create the finest, most effective bubbles for the removal of organic contaminants from industrial wastewater. Then, we introduce them properly to the wastewater stream to maximize the natural attraction of the bubbles to the contaminants.

Finally, we utilize chemical assistants such as coagulants or flocculants only when necessary; and only then for the purpose of precipitating and removing dissolved, emulsified, and colloidal contaminants. Our main contribution has been to eliminate the use of polymers and other chemical



A properly designed and operated DAF aeration/recycle system will generate bubbles that are so small that they are invisible, and turn the water in a flotation clarifier an intense white color. These bubbles will remain suspended in the water for several minutes, providing sufficient time for the bubbles to contact contaminants in the water.

assistants that compensate for mechanical deficiencies in DAF equipment design and operation. VanAire's wastewater pretreatment equipment helps our customers save money by reducing TSS, BOD, and FOG discharge levels, therefore reducing surcharges, increasing by-product recovery, reducing loads on lagoons and secondary treatment facilities, and preventing costly expansions of secondary treatment facilities.

### What is Dissolved Air Flotation (DAF)

DAF is a mechanical process using ultra-fine air bubbles to separate somewhat neutral or positively buoyant contaminants from water. These contaminants form nuclei on which microscopic air bubbles coalesce. The air bubbles add buoyancy to contaminants, causing them to float to the surface.



Concurrent skimming allows the float to age and become more dense, reducing rendering, hauling and land application costs.



## WHY DAF?

### Why Use VanAire's DAF Technology?

VanAire's wastewater pretreatment DAF technology is the most effective and reliable in the industry. Our aeration technology and clarifier design maximizes the removal of TSS, BOD, and FOG in all industrial wastewater streams.

VanAire's DAF technology offers the following benefits.

#### Cost Efficient

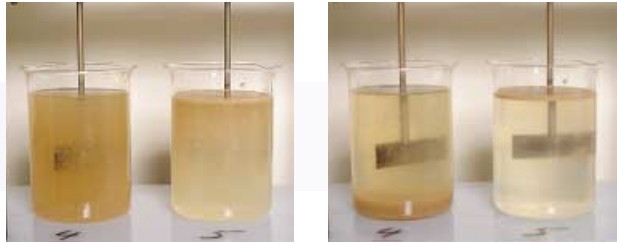
- ▶ Reduction in wastewater surcharges and further treatment expense.
- ▶ Better energy efficiency—physical separation vs. biological treatment.
- ▶ Recovery of useful and marketable by-products.
- ▶ Reduction in chemical usage—smaller more abundant bubbles float a finer floc.
- ▶ Cost efficient, in-house manufacturing.
- ▶ Delivery by VanAire trucks reduces freight and installation costs.

#### Design

- ▶ Most effective aeration/recycle design available.
- ▶ Compact clarifier and aeration unit designs—surface loadings up to 4-gpm/sq. ft. surface area.
- ▶ Rectangular and circular DAF clarifiers standard, with special designs and options readily available.
- ▶ Rugged proven designs, that are easily understood, operated, and maintained.
- ▶ Stainless steel and non-metallic construction for the lowest cost of ownership.
- ▶ In-house manufacturing of PLC-based control and chemical feed systems.

#### Results

- ▶ Proven superior removal of FOG, TSS, BOD, and other organic contaminants from wastewater.
- ▶ Improved sludge density—float is naturally thickened and aged on the surface.
- ▶ Quicker startup—system can often be operational the day equipment arrives.
- ▶ Temporary installation can be operated while existing equipment is demolished.
- ▶ VanAire can offer leasing, financing, and payment options to allow our equipment to meet your R.O.I. threshold and budgetary constraints.
- ▶ Long-term customer support.
- ▶ Satisfaction guaranteed.



### WATER TESTING

VanAire performs jar tests using a scaled down version of our dissolved air floatation technology.

We have an experienced water testing staff including engineers and chemists that are available to jar test any application nationwide. Although the majority of our installations do not use chemical assistance, our personnel is skilled at testing varied water streams using coagulants, flocculants, polymers, and other water clarifying chemicals.



### PILOT STUDIES

VanAire has several pilot DAFs located in the Midwest, Southeast, and West making pilot studies readily accessible. The pilot units are fully self-contained and can be used to draw off of a wastewater stream anywhere in a facility.



### DELIVERY AND INSTALLATION

VanAire trucks deliver DAFs to the installation site, like this 12 x 60 foot stainless steel clarifier. A VanAire technical crew arrives with the truck for immediate installation, equipment start-up, and training. It is often possible to have your DAF operational the same day it arrives.



### CUSTOMER SERVICE

VanAire has nationwide customer service, and we stand-by our product to ensure a satisfied customer. Our customers include some of the largest food processors in the world; meeting and exceeding their expectations when it comes to service, knowledge, dependability, and technology.





## RETROFITS Upgrade Your Existing Clarifier

VanAire has extensive experience retrofitting competitors DAFs with new aeration units and plate packs. Our technically advanced equipment drastically improves the DAF's efficiency, effluent clarity, and by-product recovery. Our retrofits have made significant improvements in each installation's water quality and operation. Reduction in chemical usage often provides pay backs that are measured in months.

Where practical, we can provide aeration retrofit upgrades to existing DAF clarifiers and can assist in the conversion of settling clarifiers to DAF units.

## EXPERIENCED MANUFACTURERS VanAire Designs and Manufactures All of Its Products

Our fully integrated production facility allows us to take your DAF project from a concept stage all the way through to a completely operational wastewater pre-treatment system. The entire system is designed, fabricated, finished, delivered, and installed by VanAire Inc.



Clarifiers and aeration systems are modularly manufactured by VanAire for cost effective and efficient production.



VanAire designs DAF clarifiers to meet all size and flow requirements.



We design and provide control, chemical feed and SCADA equipment for local and remote control and monitoring of wastewater treatment systems.

# THE DAF

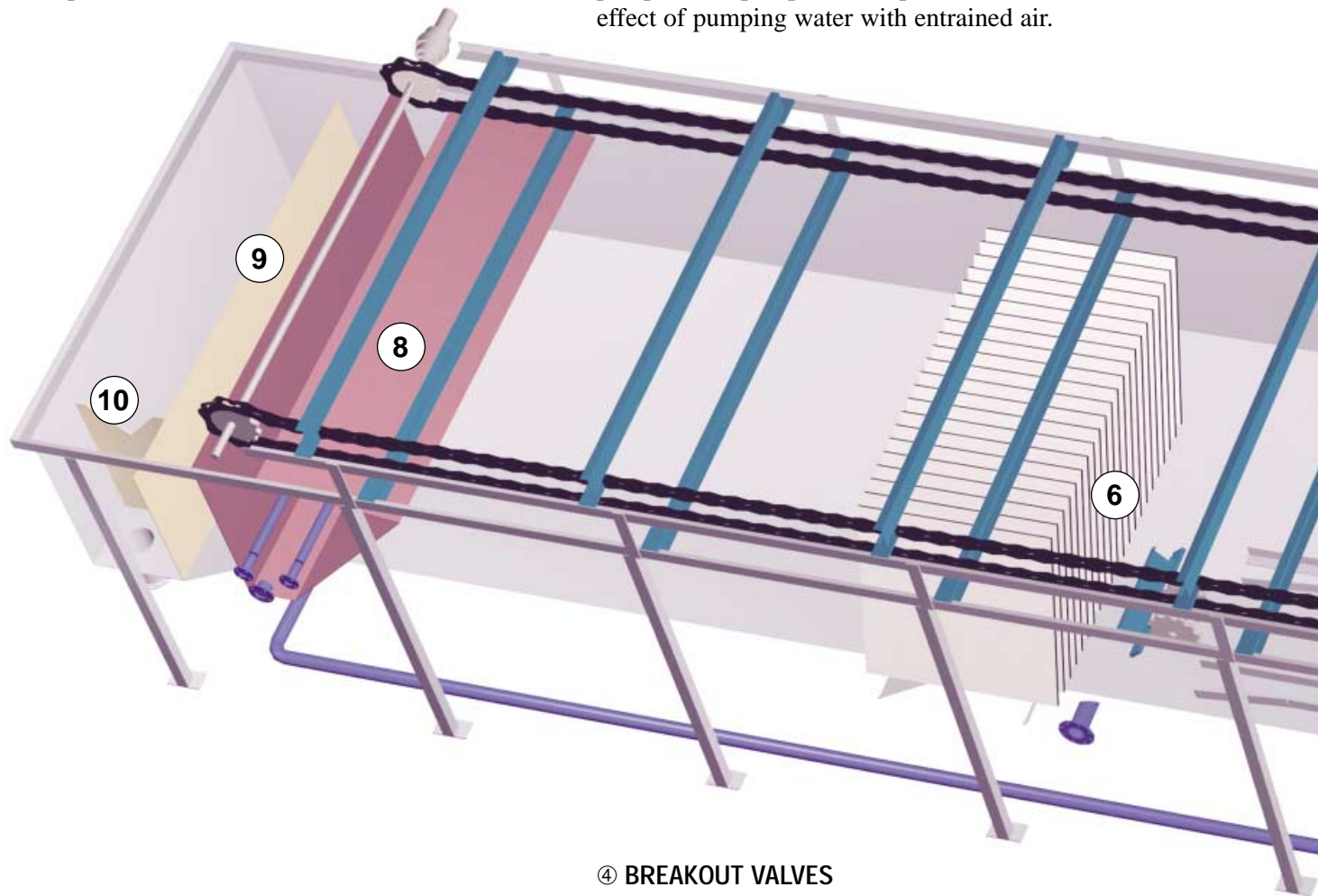
## Anatomy of the Dissolved Air Flotation Clarifier

### ① STILLING CHAMBER

The Stilling Chamber provides an opportunity for intimate contact between influent contaminants and the bubbles produced by the aeration/recycle system. Floc formed by the joining of the bubbles and contaminants is directed towards the surface by the Stilling Chamber Baffle. Turbulence caused by entrained air in the influent, or flow surges are damped here.

### ③ PUMPS

VanAire Aeration Units utilize heavy-duty single stage centrifugal pumps for simplicity and long-term durability. These pumps feature wear resistant duplex stainless steel internals, a dynamic shaft seal and closed impeller for years of maintenance-free operation. Also, VanAire introduces compressed air on the discharge side of the recycle pump, so the pump is not exposed to the erosive effect of pumping water with entrained air.



### ② RECYCLE SYSTEM SATURATION CHAMBERS

VanAire's exclusive Saturation Chamber design is the heart of our superior aeration technology. Compressed air is injected into the recycle stream on the discharge side of the recycle pump. The resulting air/water mixture flows into the saturation chamber, where it is exposed to tremendous turbulence. This turbulence is used to maximize the amount of air that dissolves in the recycle stream. The Saturation Chamber also separates any undissolved gasses from the recycle flow, eliminating the disruptive effect that these undissolved gasses have on the DAF Clarifier.

### ④ BREAKOUT VALVES

VanAire's exclusive Breakout Valve design creates the most effective DAF bubbles in the industry. This design creates the violent, high-shear action necessary to release the dissolved gasses as microscopic bubbles.

### ⑤ SKIMMING MECHANISM

The concurrent top skimming mechanism and the continuous support of the float by our aeration maximizes float density, and minimizes the settling of previously floated contaminants. VanAire offers the option of corrosion resistant fiber reinforced polyester or 304 stainless steel chain.

### ⑥ PLATE-PACK

An optional and exclusive cross-flow plate-pack and a second stage of aeration can be located near the mid-point of the DAF clarifier. This plate pack provides a damping effect on the water in the DAF, and provides a surface for the coalescing of bubbles and microscopic particles. As the bubbles and particles build up on the underside of the plates, the particles agglomerate into larger particles, eventually floating to the surface. Our cross-flow design does not affect the normal flow patterns in the DAF; so hydraulic loading rates are not affected.

### ⑧ BEACH-FLOAT HOPPER

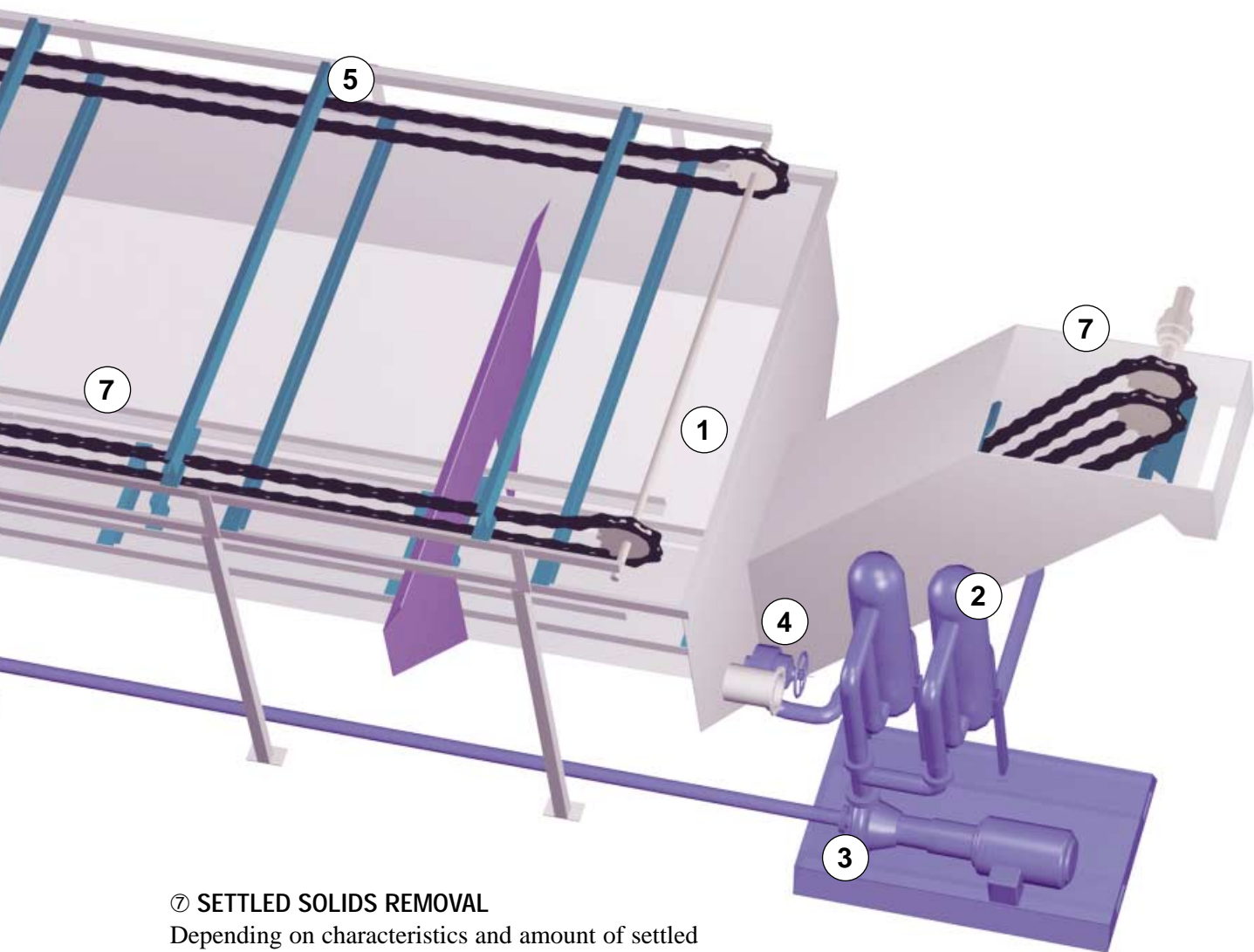
The concurrent skimming mechanism pushes the float up the inclined beach plate. An adjustable time delay feature is included to pause the top flights on the beach, allowing free water to drain from the float.

### ⑨ OVERFLOW WEIR

Allows the working level of the DAF Clarifier to be manually adjusted to position the waterline properly on the beach.

### ⑩ V-NOTCH WEIR

A V-notch weir can be provided for simple flow indication and measurement.



### ⑦ SETTLED SOLIDS REMOVAL

Depending on characteristics and amount of settled solids anticipated, settled solids can be removed above the waterline using a chain and flight removal system; below the waterline using a chain and flight system with a blow down valve; or simply through a series of drain valves along the bottom of the DAF Clarifier.

VanAire has over a decade of DAF experience in varied applications, installations, and retrofits. We have experience working with the following industries:

- Beef Slaughter
- Cheese Production
- Chicken Slaughter
- Cooked Meats
- Dairy Processing
- Gelatin Production
- Human Waste
- Laundry
- Oil/Water Separation
- Pork Slaughter
- Paint
- Pulp and Paper



Small systems, like this Mini-DAF unit, can be supplied for flows up to 100 gpm.



This VanAire DAF is installed at a chicken slaughter plant with a chemical treatment program. DAF effluent is typically under 100 ppm BOD, 10 ppm FOG/ TSS.

**Let us assist you in the design and optimization of your plant's wastewater pre-treatment and by-product recovery systems.**

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