

# ***Dissolved Air Flotation***

## ***For Municipal Clarification and Thickening***



# Dissolved Air Flotation



*Algal Bloom Dissolved Air Flotation Treatment*

## **The WesTech Advantage**

- **Multiple DAF Design Configurations**
- **Process Expertise and Proven Design**
- **Custom Applications**
- **Large Installation List Worldwide**
- **Responsive Customer Service**

## **Cost Savings in Sludge Thickening**

WesTech DAF units produce thickened solids concentrations which make them ideal for handling Waste Activated Sludge (WAS), and other thickening applications. By sending WAS through a DAF unit to thicken the sludge, it can increase solids concentrations from less than 0.5 percent up to 3-5 percent. This allows plant operations to process 6 to 10 times less sludge by thickening first, meaning sludge treatment and disposal are decreased dramatically, resulting in a significant savings for customers.



*DAF Bench Scale Test*

## **Proven Process**

Dissolved Air Flotation (DAF) is an effective process for clarification and thickening applications in water and wastewater treatment through the driving force of microscopic air bubbles. These microscopic bubbles adhere to incoming solids and form a buoyant blanket which rises to the surface of the DAF tank for removal by mechanical means.

With extensive experience and a reputation for quality equipment and customer service, WesTech offers a complete line of DAF units to municipal and industrial clients around the world. With hundreds of DAF mechanisms currently in operation, WesTech has been proven to be a cost competitive provider of DAF units customized to plant specifications.

## **High Rate Clarification**

Dissolved Air Flotation is ideal in clarifying waters and wastewaters where the specific gravity of suspended solids or contaminants is close to or less than 1.0. These include oils, grease, algae, and other low density solids which do not settle effectively or have the tendency to float to the water's surface.

Rise rates for a traditional DAF mechanism are up to 8 times higher than that of a typical secondary clarifier. This is due to the difference in buoyant forces associated with air flotation versus gravitational forces associated with sedimentation. In wastewater applications this means a smaller footprint is required for similar clarification results when compared with a secondary clarifier. Higher rise rates and smaller footprints can be expected when optional inclined plates are included in the DAF mechanism.

## **Municipal Processes:**

- **Water and Wastewater Clarification**
- **Activated Sludge Thickening**
- **Membrane Pretreatment**
- **Filter Backwash Recovery**
- **Oil and Grease Removal**
- **Algae Removal**



# Design Flexibility

*Using customer specifications, standard design methods, computer software, and experience for process sizing, WesTech customizes each project to suit your specific application. Cost-competitive designs and proven results ensure that your process needs are fully met in the design of each system.*

## Typical DAF Configurations



### Circular Column Supported DAF

- Larger diameter tanks (50 to 85 feet in diameter)
- Heavy duty cage drive
- Typical bottom fed influent with top fed recycle



### Circular Bridge Supported DAF

- Smaller diameter tanks (less than 50 feet in diameter)
- Heavy duty shaft drive
- Typical side or top fed influent with concentric recycle



### Rectangular DAF

- Available up to 20 feet wide x 80 feet long
- Ships fully shop-assembled
- Non-metallic or stainless steel internals
- Optional ZICKERT Shark™ sludge and float removal mechanisms

## Circular Design Benefits

There are many important advantages associated with the circular DAF design. A 360 degree distribution of flow and microscopic bubbles from the tank center outward allow full advantage of tank surface area for effective flotation and uniform upflow. With low velocity under the float baffle, there is less potential for solids carryover and short-circuiting. In addition, circular tanks have economic advantages at higher flow rates and certain footprint advantages.

## Key Features of Circular DAF Units

**Haymore Valve** - optimal release of dissolved air

**Premium Drive Unit** - higher torque applications

**Drive Configuration** - no tank penetrations requiring mechanical seals

**Fewer Wear Parts** - no chain and sprockets meaning less maintenance



*Elevated Steel Tank with Domed Cover*

## Other Design Options

WesTech has several supplementary features and other design options available, providing greater flexibility and customization to meet your specific process equipment needs. Some of these features include:

**Steel Tanks** – anchor channel, flat-bottom, or elevated

**Skid-mounted Packaged System** – up to 12 feet in diameter

**Tank Covers** – steel, aluminum, or fiberglass

**Induction Pump** – replaces standard pressurization system in processes with lower recycle flow rates

**Optional Inclined Plates** – increases rise rates

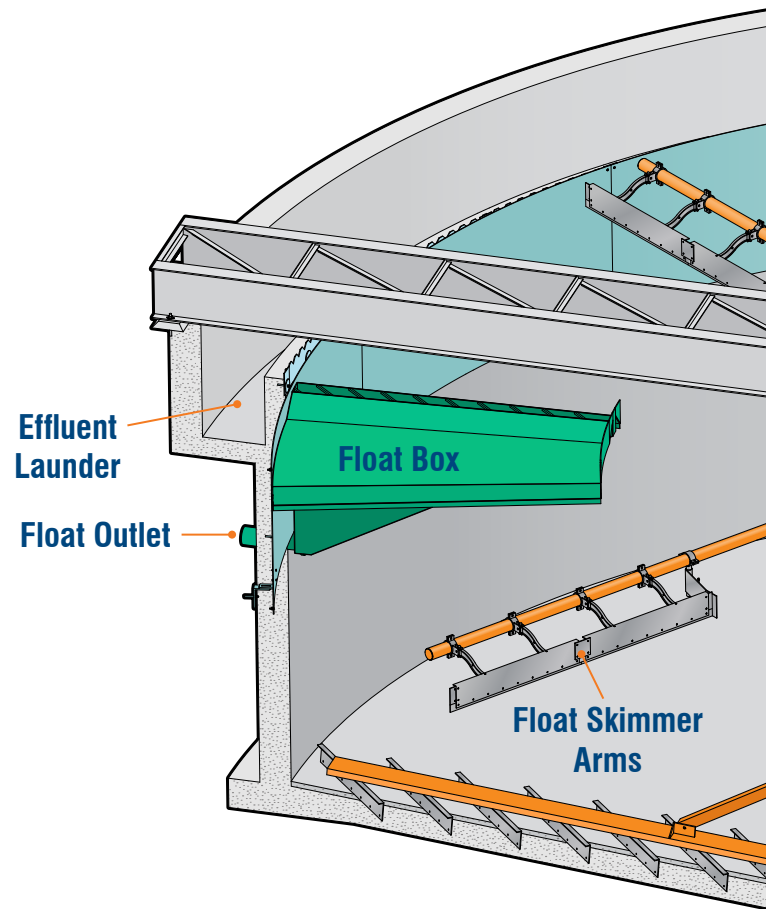
# Understanding the DAF Process

## How DAF Mechanisms Work

A typical DAF system is designed to recirculate a portion of clarified effluent through a pressurization system by means of a centrifugal recycle pump. The recycled effluent flow is pumped into an air saturation tank where compressed air is dissolved into the flow under pressure.

The air saturated recycle is then fed under pressure to the center of the DAF tank where it thoroughly mixes with the DAF influent flow. The sudden release of pressure by means of a back pressure control valve causes the dissolved air to come out of solution and form microscopic bubbles. These microscopic bubbles adhere to incoming solids and form a buoyant blanket which rises to the surface for mechanical removal.

Floating solids are skimmed into a float box by rotating skimmer arms. Any settled solids are scraped to the center of the tank by sludge rake arms for removal from the DAF sludge hopper. Clarified effluent exits the tank under a float retention baffle and into a peripheral effluent launder.

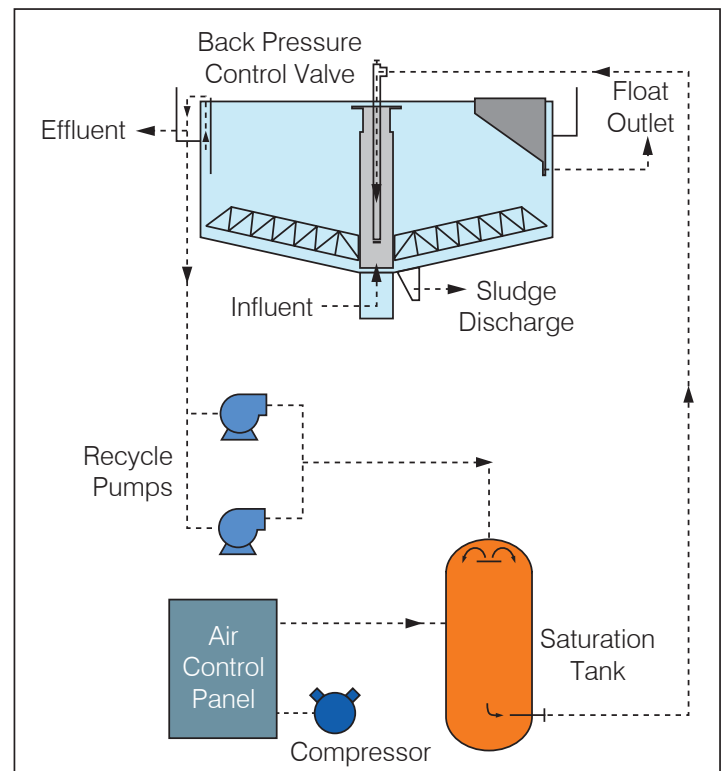


## WesTech's Pressurization System

- Enhanced Saturation Efficiency
- Properly Designed Air-to-solids Ratio
- Effective Mixing of Influent and Recycle
- Media Free Saturation Tank
- Optional Induction Pump System

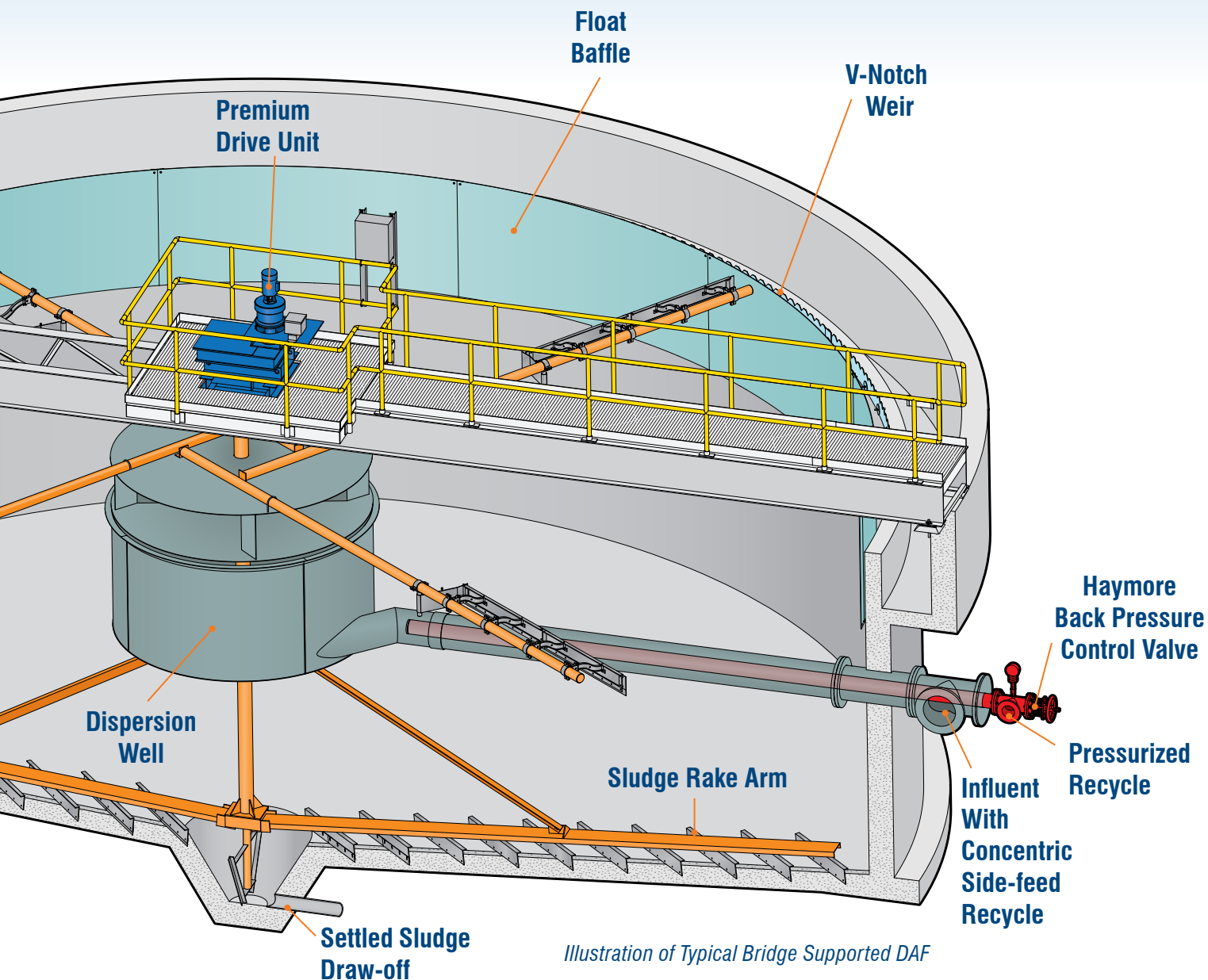


Skid-mounted Pressurization System



P&ID for Typical Column Supported DAF





## Haymore Back Pressure Control Valve

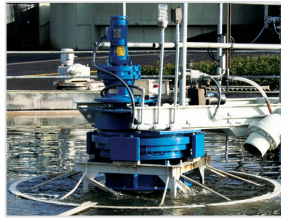
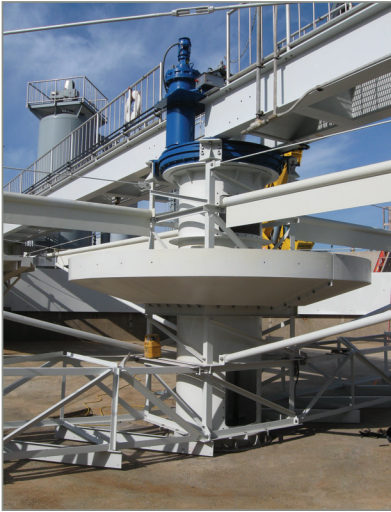
The WesTech exclusive Haymore Back Pressure Control Valve is uniquely designed to optimize the release of dissolved air concentric to the influent stream at the *center* of the DAF mechanism, rather than at the perimeter. This maximizes the benefit of a circular DAF design by allowing proportional distribution of microscopic air bubbles over a larger surface area, increasing the effectiveness of the flotation process. An adjustable handwheel allows the operator to control the pressure in the system. This pressure is indicated by an integral gauge complete with diaphragm seal.



*Back Pressure Control Valve*

# Built to Last

*WesTech materials of construction and finishes meet the highest industry standards in order to prolong the useful life of each component. The WesTech DAF equipment is of the highest quality and is built to last.*



*Our flexibility in design allows for various drive arrangements that best match process and mechanical requirements.*

## Premium Drive Unit

The WesTech drive unit has several features which have been proven to meet the toughest of circular DAF process requirements:

**Precision Bearing** – resists powerful overturning moments caused by skimmer and rake arms.

**Directly Driven** – eliminates need for drive chain and belts and reduces maintenance.

**Torkmatic™ Overload Protection** – indicates torque and prevents damage to the mechanism.

**All-grease Lubricated** – eliminates need for condensate draining and messy oil changes.

## Skimming/Scraping Combination

Properly sized and spaced skimmer arms, along with properly sized float boxes, remove floated solids in an efficient and effective manner. The WesTech surface-skimming mechanism is integral with its bottom-scraping mechanism, which means:

**Single Drive Unit** – lower capital and operation costs.

**Fully Self-Supported** – does not require the use of roller wheels along tank perimeter.

**No Chain and Flights** – less maintenance and fewer wear parts because of precision bearing design.



*Years of experience and continual design improvements have enabled WesTech to build a DAF product line that requires relatively low maintenance, helping your equipment last well beyond the warranty period.*



# Upgrades and Retrofits



## Retrofits

WesTech can retrofit an existing clarifier or thickener tank with a DAF mechanism to improve your process performance for lowered costs. Because of the DAF's capacity to handle increased rise rates (requiring smaller tankage area), a DAF mechanism is ideal for being retrofitted into existing systems for clarification and thickening.

A qualified WesTech representative can visit your site to evaluate and discuss the feasibility of retrofitting an empty tank or a tank containing equipment that is outdated, inefficient, or non-operational. Our representative will also record detailed measurements and plan for any special installation requirements.

- **Increased Performance**
- **Utilize Existing Infrastructure**
- **Less Cost Than Entire Replacement**
- **Enhanced Process Design**

# Industrial Flotation

WesTech provides DAF mechanisms for industrial processes, including:

- **Refineries**
- **Food Processing and Food Packaging**
- **Chemical Processing**
- **Laundry**
- **Pulp and Paper**
- **Tanneries**
- **Industrial Water Treatment**

In applications such as the oil and gas industry where there is high risk for explosions, WesTech can provide Dissolved Gas Flotation (DGF) units as an alternative to dissolved air. Dissolved Nitrogen Flotation (DNF) is most often used because of the availability and inert properties of nitrogen gas, which is also used as a blanketing gas in many industrial applications.

*Learn more about WesTech's industrial capabilities in our Industrial DGF Brochure.*



# Pilot Services and Testing

## Pilot DAF Units

Skid-mounted, pilot-sized units are available for rental or sale in order to test various process scenarios. The pilot units typically have chemical feed systems; coagulation and flocculation tanks; pressurization pump; air compressor; air, influent, and recycle flow meters; saturation tank; DAF tank with mechanism; and are completely factory wired with all electrical controls, ready for use.



## Laboratory Services

WesTech offers complete laboratory testing facilities to assist in your project planning. WesTech's laboratory technicians are specialists in filtration, sedimentation, and flotation. Careful testing and analysis of your sample can provide the answers to your most difficult process problems, helping to establish design parameters and to size equipment based upon bench scale testing results.

**See more WesTech process equipment at: [westech-inc.com](http://westech-inc.com)**

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Biological Treatment  
Clarification  
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Dewatering  
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