



DAF

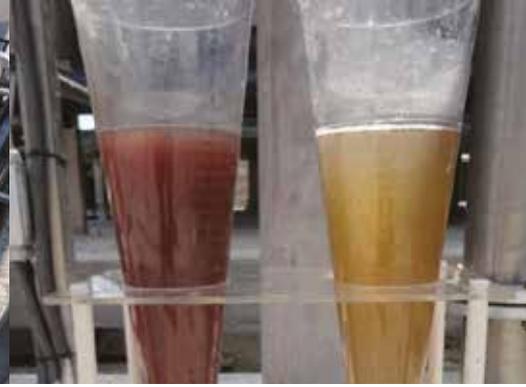
DISSOLVED AIR FLOTATION



A process that provides high quality, efficient clarification for suspended matters

Dissolved Air Flotation (DAF) is a clarification process used for the separation of solids, fats, oils, etc...

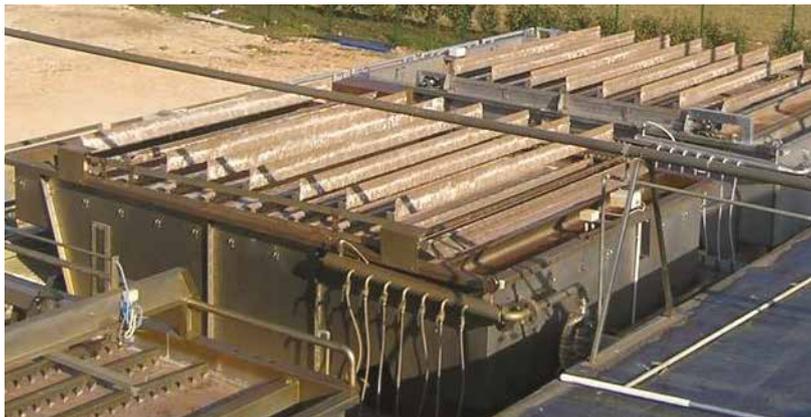
DAF systems allow a wide range of suspended substances or colloids to be removed from water, and can also be used to thicken sludge.



DAF systems can be applied as pre-treatment, to meet requirements that are not too stringent (such as discharge into public sewer) or upstream of biological plants.

DAFs are also used as systems for the separation of chemical, physical or biological sludge, since they occupy about 5 times less space than a static settler with the same flow rate.

Furthermore, they can be used to thicken already separated sludge (chemical, physical or biological), and generally allow for an increase in the concentration of a sludge from 1% to 5-6%.



DAF is a proven and effective physical/chemical technology commonly used for many industrial and municipal applications, including:

- **Product recovery and reuse**
- **Pretreatment to meet sewer discharge limits**
- **Pretreatment to reduce loading on downstream biological systems**
- **Polishing of biological treatment effluent**
- **Silt and grease removal from industrial water**

Key Features

- **Total Suspended Solids (TSS) reduction of up to 97%**
- **Chemical Oxygen Demand (COD) removal of up to 85%**
- **Low Operations and Maintenance (O&M) costs**
- **Standard and customized units to meet a variety of application and flow ranges**
- **Designed for ease of installation and use**
- **Suitable materials for high-salinity water**



Process

There are two preparatory processes for flotation: coagulation and flocculation of substances such as suspended solids, oil, fats, proteins, etc ...

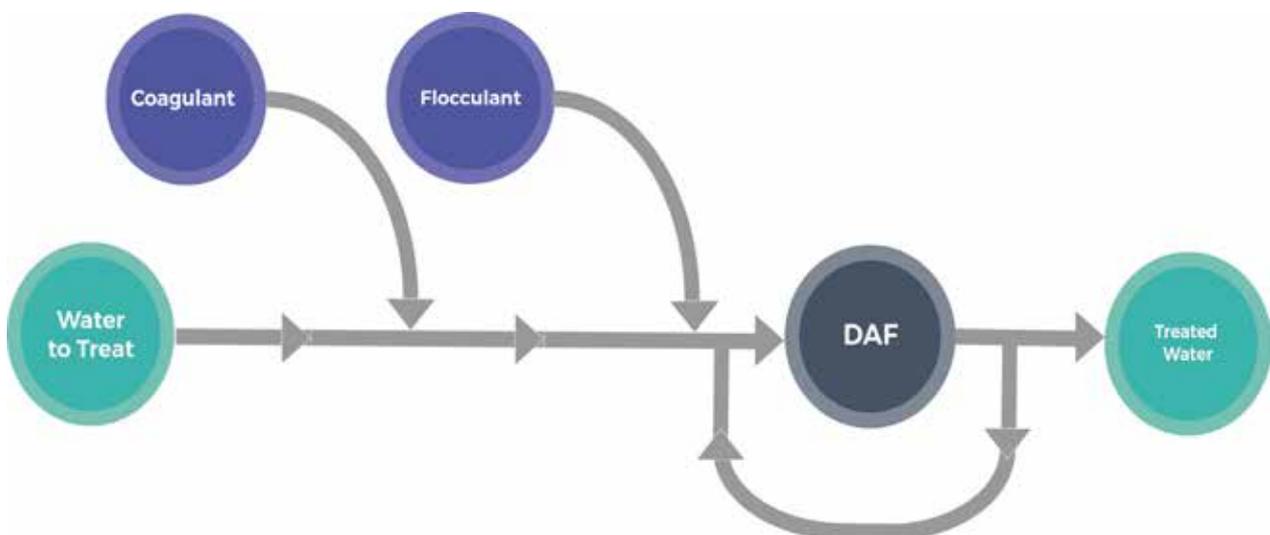
Coagulation is accomplished by adding chemicals such as iron chloride or aluminum polychloride to the wastewater; this addition causes the destabilization of the colloids and their union in larger particles. Flocculation is carried out by means of other chemical products (generally polyelectrolytes), and coagulates the particles into larger and more easily removable "flakes".

The actual flotation is an operation used to separate solid particles from liquids. The separation is achieved by introducing a gas (usually air) dispersed in fine bubbles into the liquid. These bubbles adhere to the particles and drag them to the surface of the liquid itself.

Flotation is effective both for particles that have a density greater than that of water, and, more so, for particles that have a lower density.

Given that the solubility of the air in the water increases with increasing pressure, the following system is used to generate fine bubbles: a part of the waste is saturated with air at a pressure of 5 ÷ 6 bar. The air-saturated waste stream is then conveyed into the flotation tank, which is at atmospheric pressure. The pressure drop causes the previously solubilized air to be released in the whole mass of liquid in the form of minute bubbles, forming a floating bed of sludge.

A scraping assembly skims the sludge off the surface of the water and into a sump, from where it will be pumped to the subsequent treatments, while the treated water is ready for discharge or for further purification processes.



Applications

Municipalities

- Water Treatment Plants
- Wastewater Treatment Plants
- Biological Treatment Plants
- Algae Removal
- Fat and Oil Removal Plants

Industrial

- Meat/Poultry/Fish Processing
- Dairy Industries
- Food Processing
- Petroleum/Oil Refineries
- Pulp and Paper

Solution Architecture

DAF unit: made of AISI 304 stainless steel and equipped with a flocculate accumulation basin.

Flocculate scraper: composed of #1 driveshaft, with two gears placed at its extremities; #1 secondary shaft, with two gears placed at its extremities; #2 transmission chains (which transmit the motion from

the driveshaft to the secondary shaft); and #4 scraper blades, made of rubber, fixed to the two chains.

Hypersaturation system: consisting of an air saturator and a subsequent centrifugal pump, or a multi-rotor centrifugal pump with injection of air directly into the latter body.

Models	Dimensions			Max flow rate *	Max solid load*
	Length (m)	Width (m)	Height (m)	(m ³ /h)	(kg/h)
1.5x3	1.5	2.7	1.3	20	45
2x3	2.2	2.7	1.3	30	60
2x5	2.2	4.7	1.5	50	100
3x5	3.2	4.7	1.7	75	150
3x6	3.2	5.7	1.7	90	180
4x6	4.2	5.7	1.7	120	240

* average values depend on the characteristics of the treated flow

About Fluence

Fluence is a leader in the decentralized water, wastewater and reuse treatment markets, setting the industry pace with its Smart Products Solutions, including Aspiral™, NIROBOX™ and SUBRE. Fluence offers an integrated range of services across the complete water cycle, from early stage evaluation, through design and delivery to ongoing support and optimization of water related assets, as well as Build Own Operate

Transfer (BOOT) and other recurring revenue solutions. With established operations in North America, South America, the Middle East, Europe and China, Fluence has experience operating in over 70 countries worldwide and enables businesses and communities worldwide to maximize their water resources.