SUPRACELL Circular DAF
Dissolved Air Flotation Clarifier

The KROFTA ™ Supracell ™ is available in 20 standard sizes ranging from 4 to 70 feet in diameter. This wide range of standard sizes cost-effectively processes flows from 35 gpm to 12,000 gpm in a single unit. If space is an issue, units can be easily stacked on top of each other for a smaller footprint. Units are sized based on solids loading, flow rate, recycle requirements, and flotation characteristics. Maximum theoretical loading to the unit is 3.0 to 3.5 gpm/sf. All wetted parts on the Supracell are constructed of 304L stainless steel with 316 stainless steel as an option. On units 15 feet in diameter and under, the entire unit including the carriage assembly is stainless steel. On units above 15 feet in diameter, carriage assemblies and substructures are fabricated in mild steel and then painted with an epoxy coating. Stainless steel is available as an upgrade on the larger size units.

The Air Dissolving Tube (ADT)

Common to all Krofta DAF technology the Krofta™ Air Dissolving Tube (ADT) is in operation in over 2500 applications around the world. The ADT eliminates the need for large volumes of air and water used by typical pressure vessels, by using air dispersion technology and centrifugal force in place of sheer volume and gravity. Compressed air is pumped into the ADT across the surface of an air panel. The panel material and design disperses the air across the entire surface of the panel. This allows for faster dissolution of air into the water and hence a retention time of only eight to twelve seconds. The flow pattern within the ADT is a cyclone or vortex which produces a centrifugal force that eliminates undesirable entrained air. A specially designed inlet nozzle is sized specifically for each application and can be easily changed out if the recycle requirements of future waste streams change dramatically. In addition, a proprietary bleed-off outlet also assists in eliminating too much air in the tube itself. This ensures that the tube will never air bind or create a plug flow around the air panel. A sized globe valve is used for pressure release, generating 30-70 micron bubbles well suited for DAF operation.

Supracell Process Description

As the rotating carriage travels in one direction, untreated water flows into the unit in the opposite direction. As the two forces oppose each other they equalize, creating 'zero-velocity' within the flotation cell. The fine air bubbles from the ADT can then easily attach and lift suspended solids to the surface where the sludge blanket is formed. The clarified water is then drawn off of the bottom of the tank through the effluent extraction pipes into a common clear well where it is discharged by gravity through the bottom of the unit. Floated sludge is removed by the spiral scoop and deposited out a central sludge well. A portion of the clarified water is recycled to feed the ADT as described above.

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Automatic Level Control

An automatic level control system (manual weir is optional) constantly monitors flow fluctuations and keeps the level in the tank accurate to ½" to ensure consistent and precise sludge removal. The automatic level control system consists of a pressure transducer mounted on the tank to monitor level fluctuations, a process control unit, and a level control valve mounted on the effluent line of the tank to modulate flow as needed to maintain the preset level.

TABLE OF CAPACITIES

SIZE Diameter (Feet)	CAPACITY gpm
4	30
6	65
8	148
10	263
12	394
15	525
18	789
20	961
22	1160
24	1340
27	1695
30	2090
33	2580
36	3125
40	3840
44	4630
49	5650
55	7290
62	9265
70	11800

Operational Advantages

There is only 18-22 inches of water in the clarifier; therefore the unit has a very low floor loading. Typically, units will weigh ~160 lbs / sf or less.

The shallow tank design provides for easy operation, tank inspection and cleaning.

A viewing window is mounted on the side of the tank for observation of the flotation process and facilitates the optimization of chemical dosing (if necessary).

The shallow, open tank design also allows for utilization of the unit on a wide variety of applications. Heavy oil and grease applications or heavy sand / grit applications are well suited to the design since there are few obstructions within the tank to accumulate solids.

A bottom scraper cleans the unit of any sediment debris that is then automatically purged.

All of the inlet and outlet connections are at the bottom of the unit, allowing the unit to be installed in an elevated position.

Elevation eliminates the need for an additional pumping stage when it is necessary to drain the clarified water or floated sludge.

The spiral scoop mechanism is designed for precise sludge removal by biting into only the sludge layer above the clarified water level. This increases floated sludge consistency, benefiting downstream sludge handling equipment by reducing flow and chemical consumption on the press.