Settler Filter Floater SFF

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SFF 630

Combination of three unit operations, single stage system SFF 630 is designed to treat a variety of industrial process and waste water streams. **Sedimentation**, for solid-liquid separation by gravitational settling; D.A. **Flotation**, for suspended solids, oil and grease and BOD_5 removal by introduction of a gas phase directly into the waste, causing the pollutants to rise to the surface and to float; **Filtration**, probably the most important single unit operation of all the water treatment processes, for separation of oil and suspended matter from water by flowing it through a filter medium.

From the effectiveness of three reliable processes, our warranty of high performances as to unparalleled low footprint.

OPERATION

Settling

Settling section is a long narrow rectangular tank, equipped with scale extraction devices and oil skimmers for coarse solid particles and free oil removal. At the section inlet influent stream is equally distributed across the basin width, to provide stable and retarded flow. At the section outlet water flow is controlled with fine mesh inox screens before it overflows to the adjacent flotation and filtration basin through adjustable special-design inboard weir. Some settling zone design details are:

- Service : *Continuous settling*
- Shape coefficient on total lenght : *4*
- Shape coefficient on efficient lenght : *3,4*
- Surface load – Specific flowrate : *7,2 $m^3/m^2/h$*
- Surface : *102 m^2*
- Liquid height : *3,5 m*
- Scale extraction devices : *Air lift*
- Slopes : *V-cone-shaped bottom*
- Oil skimming devices : *2, band-press type*
- Screens : *40-60 Mesh 38% O.A. 0.016-0.010" Openings*

Flotation

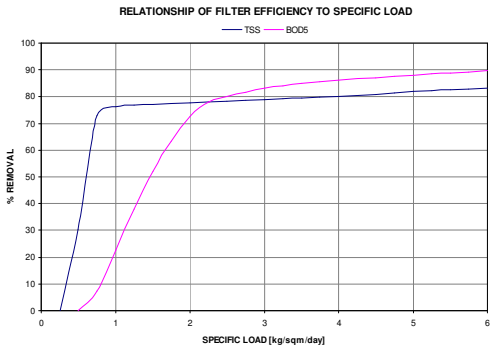
Flotation and Filtration are processes operated simultaneously, flotation in the upper and filtration in the lower section of the same basin. Water overflow from settling tank is diverted by a baffle and enters the next basin deep down, below the water surface. Here a portion of treated effluent pressurized with air is injected, releasing from solution to atmospheric pressure minute air bubbles. Another portion of effluent pressurized with air is evenly distributed in the tank through a network of porous ceramic diffusers in the lower section of the tank, inside the filter media. Oil and materials to be removed move upward and float at surface, continuously skimmed into an external gutter; treated water moves downward towards the filter. Continuous water+air uphill current and sand bed upper layer fluidization prevent filter from early fouling. Some flotation zone design details are:

- Service : Diffused Air Flotation
- A/S – air/solids ratio : 0,02 ÷ 0,08 g air/g solids*
- Recycled stream pressure : 3 ÷ 5 bar*
- Surface : 100 m^2

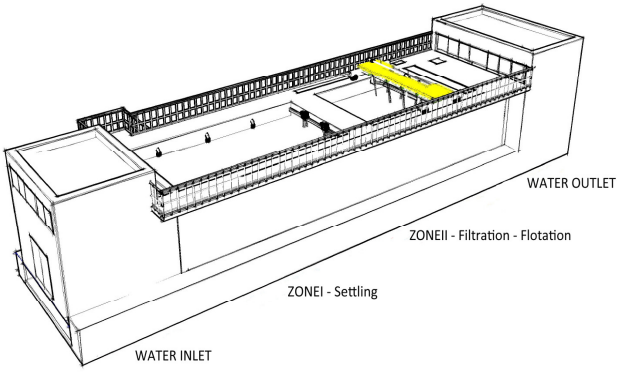
** according to waste values may vary*

Filtration

After sequential settling and flotation, water is driven by static head across the filter in the lower section of flotation-filtration basin. Filter is a false floor with nozzles and diffusers supporting a thick layer of sand of selected granulometry, separating flotation and filtration basin from storage tank. After filtration water is accumulated for conditioning prior to delivery in this storage tank. Below are for reference typical curves showing relationship of gravity filter efficiency to influent specific load:

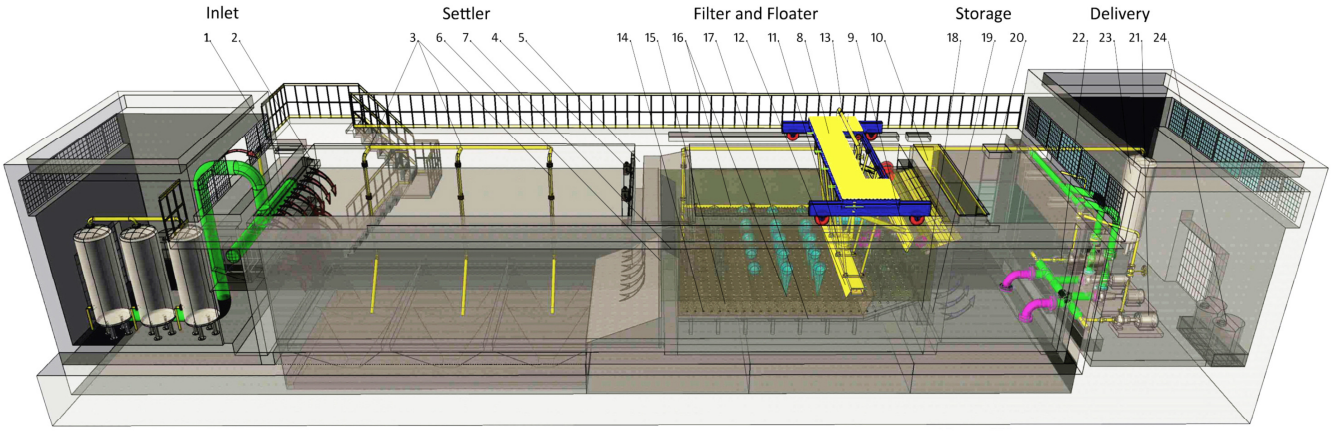


To-and-fro carriage operating the float skimmer carries filter backwash pump, rake and suction hood, for continuous media cleaning. Slurry is discharged into big bags for dehydration while mother liquor is recycled back to settling basin inlet.



SFF 630

INSIDE VIEW



Inlet zone

1. Cross sectional inlet distribution channel
2. Cross sectional inlet adjustable twin baffle

Settling zone

3. Airlift for slurry extraction
4. Oil skimmers
5. Oil discharge gutter
6. Cross sectional outlet adjustable weir
7. Adjustable screen

Filtering and Floating zone

8. To-and-fro carriage
9. Float scraper
10. Float discharge gutter
11. Filter backwash pump
12. Filter suction hood
13. Filter backwash discharge
14. Filter nozzles
15. Filter media
16. Floater fine bubble diffusers
17. False floor

Storage zone

18. Filtered water inlet
19. Screens
20. Inspection trapdoor

Delivery zone

21. Delivery pumps
22. Recycle stream pressurization pump
23. Recycle stream pressurization vessel
24. Recycle stream conditioning chemicals

ADVANTAGES

SFF 630 is an excellent single-step treatment for many sewages, taking the lead in Steelmaking and Petrochemical. Some of the features provided by SFF 630 are:

- Provision of continuous operation routing
- Removal of both free and emulsified oil
- Removal of coarse suspended solids
- Removal of solids with diameter < 10 µm, organics and colloids
- Cleaner disposal of removed materials
- System suitable for both indoor and outdoor installation
- Performance booster for obsolete settling systems

Created to implement existing settling basins and to be a reliable alternative to pressure sand filters, SFF 630 provides the following advantages over conventional systems:

- Less interconnecting piping
- Less installed power
- Less installation and operating costs
- Less civil works
- Less water loss
- Less installed equipment for easy and light automation
- Smaller footprint

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