

Field Report

Process & Waste Water Filtration (PWF)



APPLICATION

Many industrial processes generate “Turbid” (dirty or contaminated) colloidal waste water whereby the small sub-micronic material in the water cannot be removed by conventional mechanical filtration methods alone such as Ultra Filtration, Reverse Osmosis, Plate and Frame Filters, or similar devices.

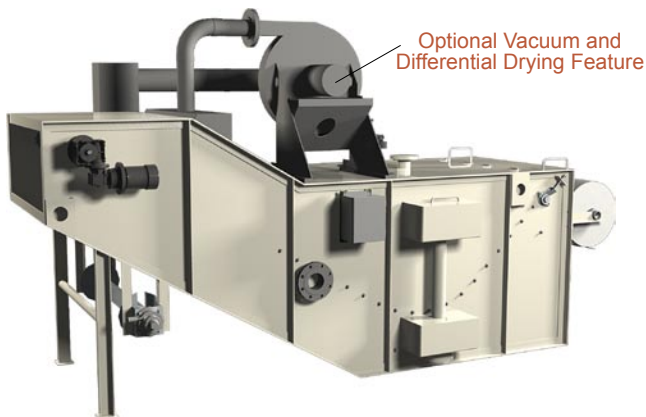
PROBLEM

Industrial facilities typically cannot recycle water with high concentrations of colloidal TSS (total suspended solids) due to plugging or fouling downstream devices such as exchangers, cooling towers, and other process equipment. Solutions using dilution, waste fresh water and the excess discharge to POTW’s create costly surcharges. Some installations send a larger portion of the water to drain or waste treatment and makeup with fresh water where applicable to dilute the concentration. As a result, water usage and discharge volumes increase, and downstream treatment of the discharged water is required as well as discharge fees for compliance.

SOLUTION

Due to the desire to recycle “turbid” or contaminated water, Fil-tertech utilizes proprietary dry separation (PDC) chemistry which coagulates and flocculates the sub-micronic particles into a stable floc. Once formed, the floc is removed by a “High Performance” Deep Bed Gravity Filter Model GSF15 or GSF30 as shown in Figure 1. The PDC process chemistry incorporates a coagulant/flocculating agent which unlike liquid chemistries require constant jar testing for treatment accuracy, is not sensitive to overdosing or chemical instability, and is consistently repeatable. The flocking agents are removed with the accumulated solids via the filter media.

Figure 1
“High Performance” Deep Bed Gravity Filter
(Model GSF30 Shown)



PROCESS

The “turbid” water is typically pumped from an existing reservoir tank to the Filtertech system that incorporates a mixing tank which is specifically sized and designed for the flow rate to be treated (see Figure 3). The PDC material is then added to the “turbid” water in the mixing tank by way of a precise volumetric solids feeder and is stored in a bulk solids hopper requiring only periodic replenishing. The volumetric solids feeder utilizes a variable speed drive which can adjust the feed rate of the PDC chemistry to coincide with changes in flow rate of “turbid” water of the system. During the mixing process, the chemistry becomes hydrated and its long chain molecule is unraveled. The sub-micronic particulates become entrapped in the molecules to form much larger floc particles in the mix tank. Specially-designed mixers are used to minimize floc degradation on the developing sludge particles.

Figure 2
Treatment System



Fully-automatic continuous flow through systems (not batch) with capacities from 2 GPM (7.6 LPM) to 100 GPM (380 LPM), 25 GPM (95 LPM) system shown.

Once completely mixed, the treated clean water and floc overflows by gravity into the floc tank where the concentrated floc and water then overflows into the Model GSF15 or GSF30 “High Performance”, Deep Bed Gravity Filter (see product Bulletin FT244 & FT245). As the treated water passes through the filter, the flocked solids are removed by the disposable filter media, thus allowing only clean water to drain by gravity back to the reservoir tank or process for reuse.

The Model GSF15 or GSF30 Deep Bed Gravity Filter have specific features for the application which include the following:

- Deep operating bed with extended discharge ramp and deep liquid pool for increased pressure drop across the media.
- Multi-function media index assembly for fully-automatic media indexing and low media sensor.

- Low velocity inlet header to enhance separation of PDC chemistry prior to entering the filter.
- Extended discharge ramp to enhance drying of filter “cake” prior to discharge.
- Fully-automatic media indexing and low media sensor.
- Positive filter side seals.
- Model GSF15 incorporates 15° discharge ramp with 15” (380 mm) liquid pool.
- Model GSF30 incorporates 30° discharge ramp with 22” (560 mm) liquid pool.

Options

- Available in 304 or 316 stainless steel construction.
- Optional vacuum differential/drying feature for specific applications.
- Optional flow meter.
- Optional spent media separator and rewinder.
- Controlled Level Indexing (CLI) feature.

RESULTS

The results, as shown in Figure 4, for typical applications are greatly increased water clarity with subsequent advantages. Discharge of the water to drain is eliminated or greatly reduced with the remaining contaminant being safely discharged into a receptacle for disposal.

The cost of operation consists of the separation chemistry, filter media, electricity, and very minimal manpower requirement to add PDC chemistry and filter media.

Figure 4
Waste water, Floc, Filtrate, Filtered Solids



The system is fully-automatic, continuous flow not a batch process achieving significant reductions in “NTU” values.

Total operating costs which include separation chemistry, filter media, and electrical costs typically average less than \$ 0.001 /gallon of water treated which varies depending on the application.

For more information on the Process and Waste Water Filtration System, please contact Filtertech or visit our web site at www.filtertech.com.

Typical Waste Water Applications Using Proprietary Dry Chemistry (PDC):

- Acid and caustic etch rinse water
- Adhesives
- Boiler fly ash
- Caster water
- Ceramic slurry treatment
- Circuit board manufacturing
- Die casting
- Die penetrants
- Extrusion water from wire jacketing
- Fats, oil and grease
- Floor scrubber/mop water
- Fluorescent die penetrant rinse water
- Food processing
- Heavy metal removal from waste water process
- Metal finishing
- Municipal
- Paints, inks, and dyes
- Parts washer/waste water
- Parts washing
- Printing waste
- Spent emulsions and coolants
- Vibratory deburring
- Numerous other applications

Filtertech furnishes extensive lab reports with before/after photos of tested sample and lab data showing reduction of dissolved metals, oil/grease, and other contaminants at no charge.

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Figure 3
Process/Waste Water Filtration System Concept

