

# Field Report

## Process & Waste Water Filtration



### APPLICATION

Many industrial process water and waste water applications generate "Turbid" (dirty) water whereby the suspended material becomes dissolved in the water and can not be removed by conventional methods such as Liquid Polymers, Ultrafiltration, Reverse Osmosis, Plate and Frame Filters or similar devices.

### PROBLEM

Due to the extremely fine dissolved sub-micronic particulate in the water it has been virtually impossible to remove the material from the water by conventional filtration methods. Many facilities typically 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. In addition, high concentrations of the material in the water cause plugging and fouling of downstream devices such as heat exchangers and cooling towers where applicable.

### EQUIPMENT

Due to the need to filter "turbid" water, Filtertech has developed proprietary dry separation 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 HGF as shown in Figure 1. The process with special features incorporates a coagulant/flocculating agent which is not sensitive to overdosing or chemical instability, but is consistently repeatable. The very small percentage of flocking agents are removed with the accumulated solids via the filter media.

### PROCESS

The "turbid" water is pumped on a bypass basis from an existing

**Figure 1**  
**Model HGF "High Performance"**  
**Deep Bed Gravity Filter**



reservoir tank by an existing or new pump to a mixing tank which is specifically sized and designed for the flow rate to be treated (see Figure 3).

The separation chemistry 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 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.

**Figure 2**  
**Treatment System**

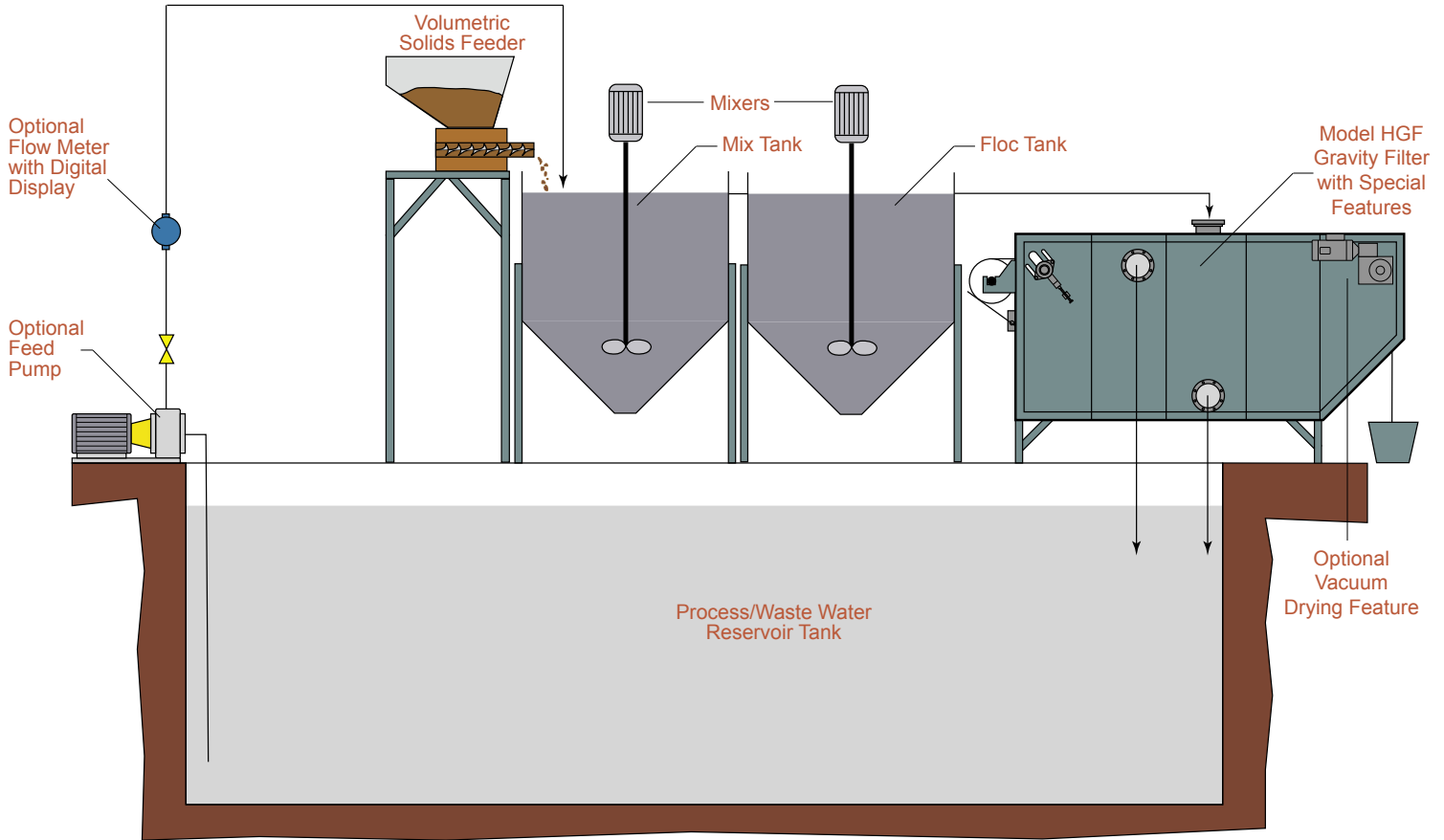


The sub-micronic particulates become entrapped in the molecule to form a much larger floc particle which is removed through efficient gravity bed filtration. Specially-designed mixers are used to minimize size reduction on the developing floc particles. Once completely mixed, the "turbid" concentrated water overflows by gravity into the Model HGF "High Performance" Deep Bed Gravity Filter (see Product Bulletin FT234D). As the concentrated 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 for reuse.

The Model HGF Deep Bed Gravity Filter has specific features for the application which include the following:

- Deep operating bed with extended liquid pool for increased pressure drop across the media.
- Multi-function media index assembly.
- Low velocity external inlet header to enhance separation of chemistry prior to entering the filter.
- Extended discharge ramp to enhance drying of filter "cake" prior to discharge.

**Figure 3**  
**Process/Waste Water Filtration**  
**System Concept**



- Fully-automatic media indexing and low media sensor.
- Positive filter side seals.
- Available in 304 or 316 stainless steel construction.
- Optional vacuum drying feature for specific applications.

**RESULTS**

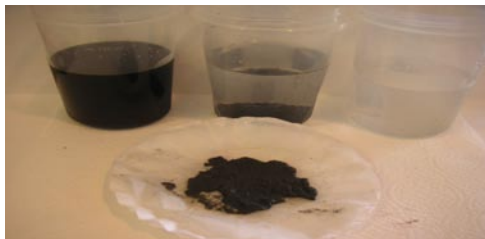
The results as shown in Figure 4, 5 and 6 for typical applications is greatly increased water clarity with subsequent advantages. Discharge of the water to drain is eliminated or greatly reduced with the remaining contaminant being safely discharged into a receptacle for disposal.

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

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

Total operating costs which includes separation chemistry, filter media, and electrical costs typically averages less than 0.1 cents /gallon of water treated which varies depending on the application.

**Figure 4**  
**Waste water, Floc, Filtrate, Filtered Solids**



**Figure 5**

**Boiler Fly Ash Water (left), Clean Filtrate (right)**



**Figure 6**

**PVC Extrusion Water (left), Clean Filtrate (right)**



For more information on the Process and Waste Water Filtration System, please contact Filtertech or visit our web site at [www.filtertech.com](http://www.filtertech.com).

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