TREATMENT
PRODUCTS
CORPORATION

Wastewater Treatment & Recovery Systems

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CROSS-FLOW MICRO-FILTRATION

Model: CFMF-HMR-1-CC Shown

APPLICATIONS

- Heavy Metals Removal
- Metal Finishing
- Aqueous Cleaner Recovery
- Suspended Solids Removal
- Precious Metal Recovery
- Grinding and Tumbling
- Vibratory Finishing
- Emulsion Splitting
- Catalyst Recovery

BENEFITS

- Easy to Install
- Simple Operation
- Rugged Construction
- Automatic Controls
- Positive physical barrier
- Low Operating Pressure
- Consistent Filtrate Quality
- Semi -Automatic Cleaning
- 0.2 Micron Absolute Porosity

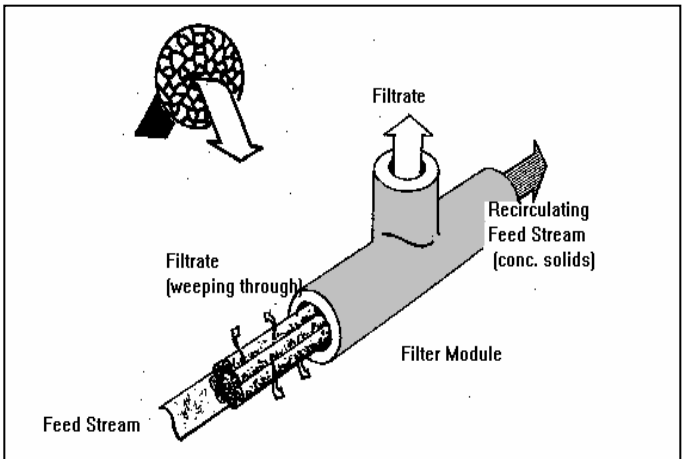
PROCESS DESCRIPTION

When removal of micron and submicron sized particles is difficult or impossible with conventional clarifiers or flow through filters, cross-flow micro-filtration systems are capable of virtually complete removal. The cross-flow micro-filtration process also breaks oil water emulsions without chemical addition. Additionally the porous polypropylene construction enhances the coalescing of submicron droplets of free oil.

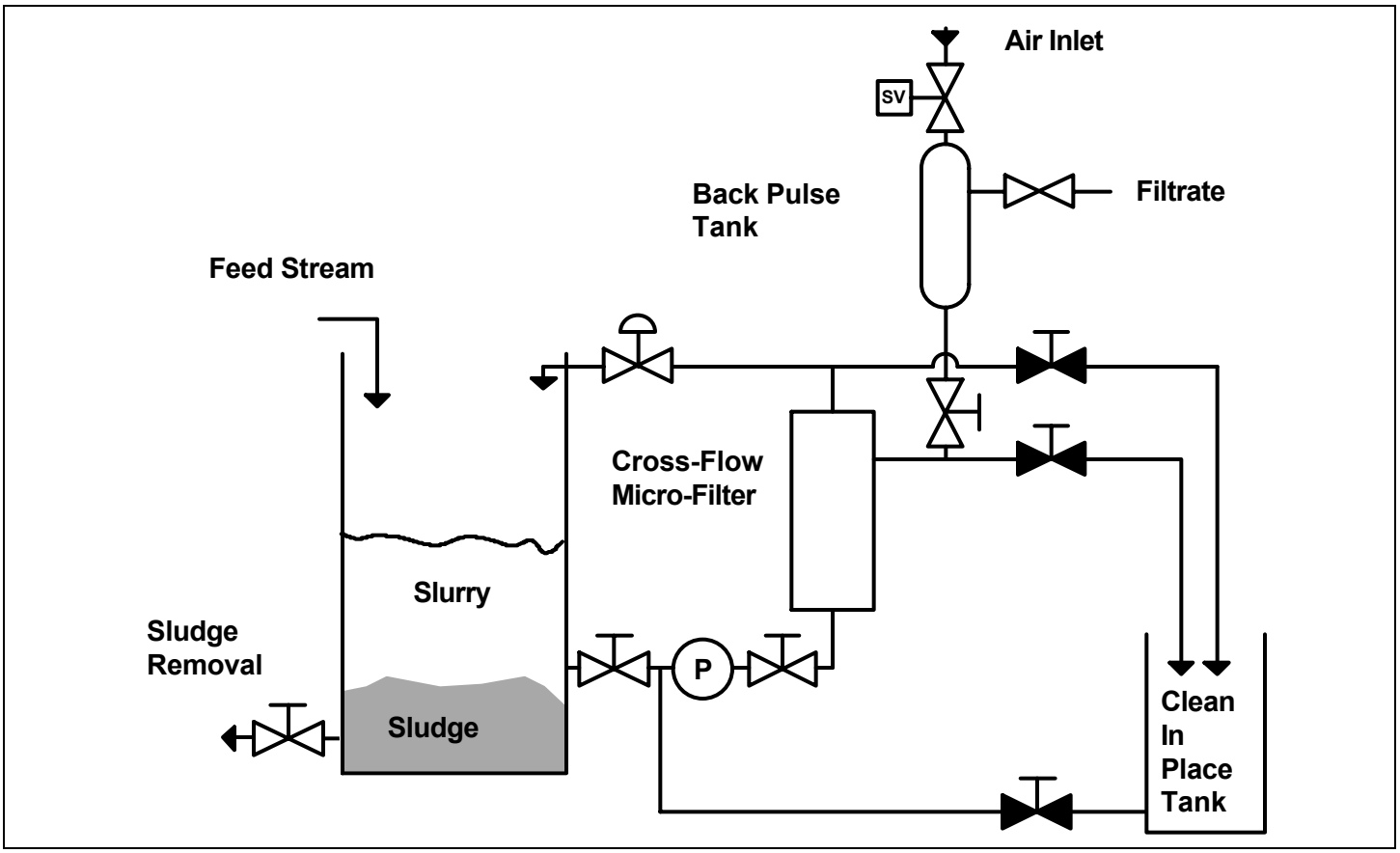
Cross-flow micro-filtration, unlike dead-end filtration, has a filtration surface which is continuously swept by flowing liquid. The shear of the flowing liquid along the tube wall minimizes the buildup of the solids on the filtration surface; thus, cross-flow filtration affords the possibility of nearly steady state operation. With conventional dead-end filtration, the filtrate rate decays as the solids layer builds up. In cross-flow micro-filtration, the direction of the feed flow is parallel to the filter surface so that accumulated solids are continuously swept away by the force of the flow.

The cross-flow micro-filter modules contain multiple porous polypropylene tubes, which have a nominal pore size of 0.2 microns. With this small pore size, large colloidal particles, and bacteria can be filtered from a process stream, but not molecular level substances. The system also has the ability to reject and concentrate high molecular weight emulsified materials such as petroleum based oils, animal fats vegetable oil, turpenes and other compounds.

The maximum pressure used for processing a liquid stream is generally 30-40 PSID with cross-flow micro-filtration systems.



Graphic Representation of Cross-Flow Micro-Filtration



Schematic Representation of a Typical Cross-Flow Micro-Filtration System

Cross-Flow Micro-Filtration is a unique process for filtration and/or separation. A fluid suspension, or emulsion under pressure, is forced through the center of a porous tube where a pressure differential is established between the inside and outside of the tube. The difference in pressure forces the liquid to pass through the wall as a very clean fluid, and the suspended material is concentrated in the feed stream. The Cross-Flow Micro-Filtration system offers a cost-effective method of separating submicron particulate from a suspension and concentrating the solids to a heavy slurry or "mud" while permitting reclamation of both solid and liquid phases. The Cross-Flow Micro-Filtration system also provides a cost effective means of splitting emulsions.

In the Cross-Flow Micro-Filtration system, the high velocity flow creates a boundary layer effect at the inside wall of the porous tube. This will vary in thickness depending on the viscosity of the fluid and the rate of flow. The "static" boundary layer of fluid acts as a hold-up area for the extremely fine particles suspended in the stream. These particles then tend to "silt out" or precoat the pores at the inner surface of the tube. After precoating, the permeability of the system appears to depend on the shape of the particles and the viscosity of the filtrate. Particles that are round, irregular or fiber like filter well with a high flux rate (usually measured in gallons per minute per square foot - GPM/sq. ft.). Fish-scale type or gelatinous particles filter with a low flux rate. In addition, increasing the temperature for the system decreases the viscosity of the fluid and thereby increases the flux rate. The maximum continuous operating temperature at a 30 PSID differential across the membrane is 160 degrees Fahrenheit.

The Cross-Flow Micro-Filtration system can be equipped with an optional backpulse mechanism to clear the system or regenerate the flow. It consists of a 0.5 to 2.0 second reverse flow pulse applied from the outside to the inside of the porous tube at intervals of 1 minute to 3 hours, depending on the concentration of the feed system. If the system exhibits reduced flux rate or the filter tubes become plugged, an in-situ chemical cleansing will restore the system, usually in less than 1 hour.

The system is extremely durable, and only an extremely rare condition would necessitate replacement of the filter tube(s). Most systems can be expected to operate for years without replacing the porous tubes.

For further information contact.

Represented By:

T.P.C.

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