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CRYSTOLITE™

Microfiltration Media, SDI Removal

As a global leader in absorbents technology and iron and manganese removal filtration, Watch Water® has developed a unique industrial water and wastewater treatment filtration solution. For micro filtration, Crystolite™ Filtration Media (CFM) is a robust, long-life back-washable filter media. Crystolite™ Filtration Media meets the needs of all industrial, municipal, residential, and water reuse, for any application. This unique, high-capacity media is designed to reduce the waste of expensive cartridges and plastic filter housings.

Working Principle

Using CFM in a pressure vessel to provide a micro filtration effect allows the water to flow through the top distributor on the top of media layer. Suspended solids are held on the highest surface area of the media allowing only clean water to flow through the Crystolite™ media. As a result, Crystolite™ can be used to filter down 0.5 microns without clogging. It allows all suspended solids to accumulate on the surface of the Crystolite™ media which are easily backwashed into a drain. The system can be designed with either a manual backwash or by using an automatic backwash cycle. The backwash cycle is a maximum 10 minutes, which uses 80% less water than any traditional anthracite or multimedia filters. This is because 90% of the solids are captured on surface and not inside of the Crystolite™ media bed. This happens because the high-tech filtration filters solids and particles down to submicron levels at 10 to 15 times the flow rate of all traditional filters. Backwash water reduction is up to 80%.

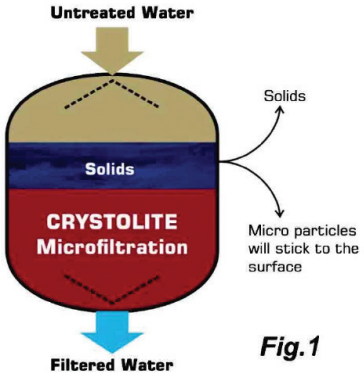

Fig.1

APPLICATIONS

- Ammonia removal
- Trace heavy metal removal
- Pretreatment of RO & RO reclaim
- Power stations
- Steel and iron mils
- Zero blown down
- High solids wastewater
- Zero blown down
  - Cooling towers
  - Boiler water
- Swimming pools
- Circulation plants for
  - Plating processes
  - Printed circuits

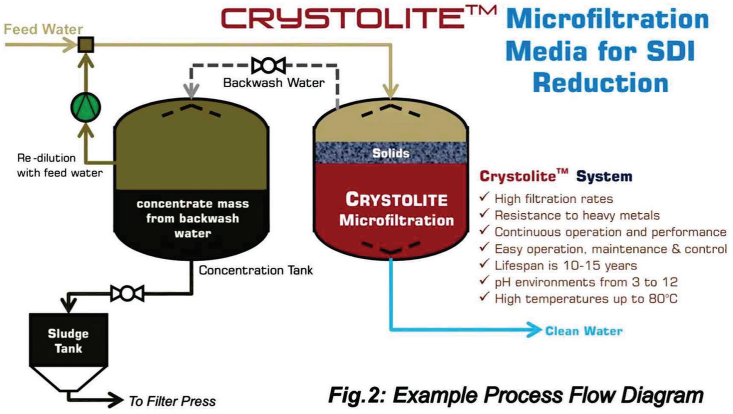

Fig.2: Example Process Flow Diagram

Benefits to Reducing SDI

When Crystolite™ is used to reduce SDI to a reverse osmosis or ultra-filtration, operating a Crystolite™ filtration system will immediately yield a significant process improvement. Typically resulting in a much longer ultra-filtration or reverse osmosis membrane life, reduced cleaning cycles, chemicals costs, reduced antiscalant, and less membrane blockage. Crystolite™ media provides better filtration and is a cost-effective alternative to changing filter cartridges on a weekly or daily basis. For solids removal up to 0.5 microns, Crystolite™ systems offer a compact alternative to extensive membrane systems which require significant electrical and chemical costs.

Crystolite™ Filtration Media filtration media:

- Can handle any process streams with high solids concentration.
- Is a challenge to other sand or multimedia filtration-based technologies.
- Is an excellent alternative to all microfiltration membranes.

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Heavy Metal Adsorption by CRYSTOLITE™

Effect of pH & Contact Time

TECHNICAL DATA

Base material	Iron oxide based minerals	
Appearance	reddish crystalline granule	
Grain size	US	14 x 30
	SI	0.6 – 1.4 mm
Bulk density	US	65.5 lb/ft^3
	SI	1050 kg/m^3
Flow direction	Down-flow or Up-flow	
Inlet water pH	3 - 12	
Freeboard (downflow)	25 - 35%	
Min. Bed Depth	US	29.5 inches
	SI	75 cm
Optimal Bed. Depth	US	47 inches
	SI	120 cm
Service flow	US	6 - 12 gpm/ ft^2
	SI	15 - 30 m/h
Backwash velocity	US	8 - 10 gpm/ ft^2
	SI	20 - 25 m/h
Backwash time	5 -10 minutes	
Rinse time	1 - 2 minutes	

Multiple regeneration is possible with OXYDES & OXYDES-P for a long service life (estimated 10 - 15 years)

Packaging:
28.3 Liters (1 ft^3) bags
40 bags on a pallet

Removal/Adsorption of heavy metals with conventional technologies like ion-exchange, reverse osmosis, and such ad activated carbon have been used worldwide with a high cost of regeneration, high concentrates, and activation process which limits the use of these technologies.

Water pollution, due to industrial wastewater and disposal of heavy metals, is the biggest global concern since this wastewater collected from municipalities is used in communities for drinking. Heavy metals pollution occurs in industrial wastewater produced by metal facilities, the mining industry, battery manufacturing processes, and the production of paints and pigments. These waste waters are acidic and contain Cd, Pb, Cu, Zh ,Ni and Cr. Toxic metals are everywhere in surface water and ground water. Therefore, Watch Water® has developed Crystolite™ Microfiltration Media to prevent these heavy metals from impacting our food chains. Another problem is phosphate iosn and Crystolite™ adsorption behavior of phosphate either with OXYOES and OXYDES-P.

The surface area of Crystolite™ is 600-620 m^2/g. This value is high in comparison with normal activated carbons. The chemical composition of Crystolite™ is $Al_2O_3FeO_3CaO$ and SiO_2. Splitting ions in the water and raising pH without adding chemicals is its strength. It also removes Cu2+ and Zu2+ ions. The rate of uptake of all metals is quite rapid; at equilibrium 98% of copper and 95% of zinc the metal concentration of 15 mg/L.

In short, all waste waters can be treated in a simple, economical process with Crystolite™. SDI reduction, ammonium removal and heavy metal adsorption can be accomplished with Crystolite™.