

Spectrum™ Filter



**Membrane Filter performance...
Without the membranes**



eco-tec
Advanced Resource Recovery
& Purification Solutions

The Membrane Filter Expectation:

Very fine filtration by removal of small particulates based on very small membrane pore sizes.

The Challenges

- Continuous plugging of fine membrane pores (i.e. fouling), membrane tube breakage and tube sheet sealing issues
- Flow and quality decline as membranes age
- High waste volumes due to cross-flow operation

The Consequences

- Regular back pulsing, chemical cleaning, and membrane replacement
- High CAPEX and high OPEX to replace and clean expensive membranes

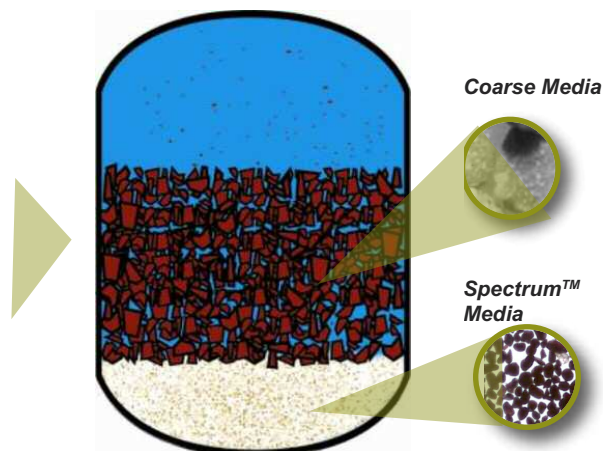
The Solution: Spectrum™ Filter - advanced *backwashable media filter*

Advanced Design

The Spectrum™ Filter uses a backwashable permanent multi-media design to achieve the performance of a membrane filter. While multi-media filters are not new, the Spectrum™ Filter uses a much finer and denser lower media layer. In operation, this fine layer approaches the consistency of sintered ceramic material.

Unlike membranes, the “pores” in the fine particulate media layer are renewed during every backwash to restore full flow. This results in a number of operational benefits:

- Virtually no “leakage” of particulate material (>1 µm) due to the very fine media
- Reduced footprint due to much higher flux rates (2-3 times higher than conventional media filters)
- Simple backwashing operation which can feature enhanced gas (e.g. air) scouring
- Minimal waste volumes due to short rinsing times and ability to recycle rinse water
- Proven proprietary internals for flow distribution, fluidization and media retention



Benefits

- Ability to handle feed water having continuous average TSS up to 50 mg/L (equivalent to about 50 NTU in the case of many surface waters) and peak turbidity (i.e. excursions) in excess of 100 mg/L TSS
- Produce filtered water quality with:
 - <0.2 NTU (< 0.2 mg/l TSS)
 - SDI of 3 to 5
 - Removal of over 98% of particles > 2 micron
- An excellent pre-filtration for packed bed ion exchange and reverse osmosis or water injection to underground aquifers
- Stable flow and filtrate turbidity with no decline, cycle after cycle
- No need for regular chemical cleaning
- No regular media replacement



Features

- Standard models capable of handling net flows of 20 – 350 m³/hr (90 – 1500 gpm) which include the following:
 - Lined steel vessels (Designed according to ASME, PED, etc) with proprietary internals
 - Stainless steel piping (other materials available)
 - Fully automated system with PLC control and instrumentation
 - Feed and backwash pumps as required
 - Coagulant dosing system and ancillary equipment
- Multiple filters can be configured to handle higher flows or to provide process redundancy
- A modified version, Spectrum™ Plus, is available for treating oily water (i.e. produced water)



Superior Performance

Figure 1

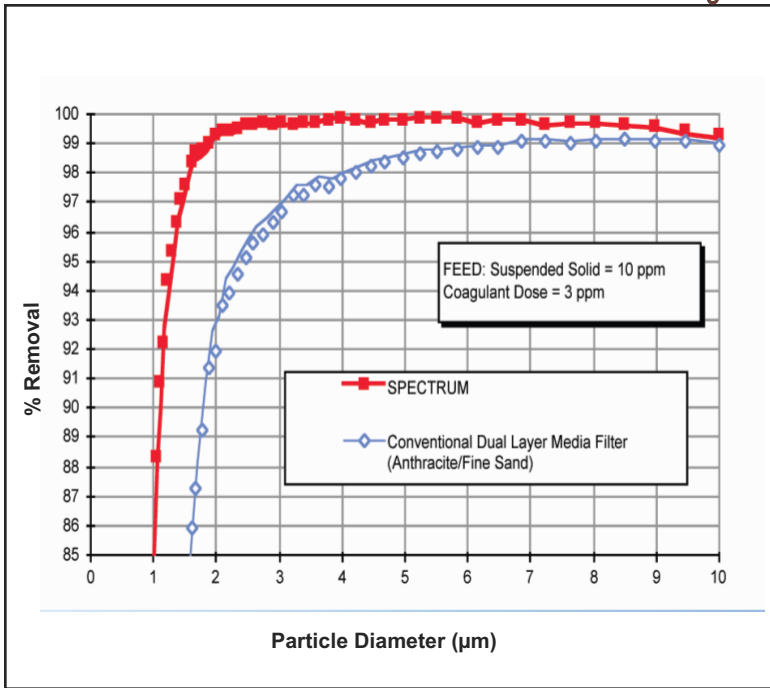


Figure 2

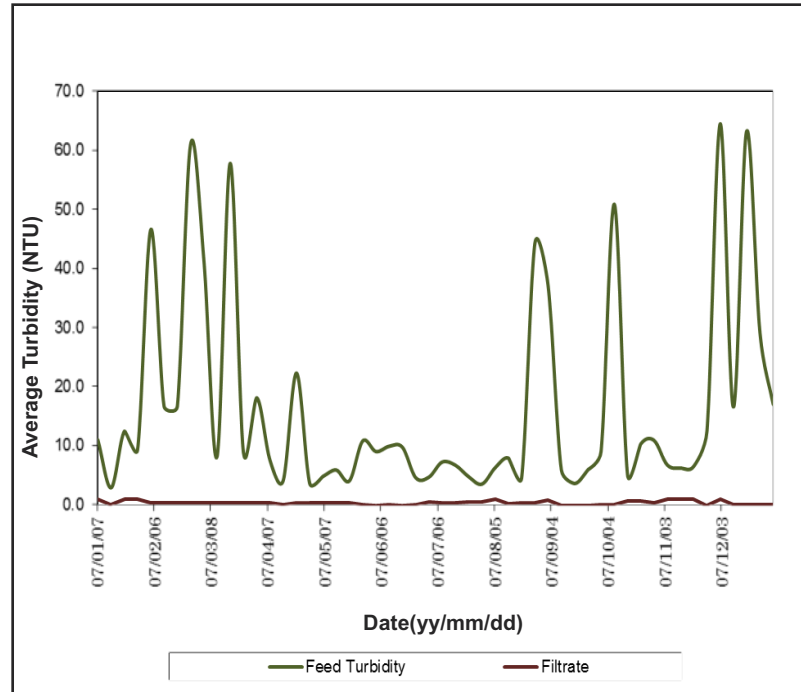


Figure 1 shows a comparison of the particle removal efficiency of the Spectrum™ Filter and Conventional Dual Media Filter. Note that the Spectrum™ Filter removes more than 98% of particles greater than 2 micron from a 10 ppm TSS feed.

Figure 2 shows actual performance data from a 1300 gpm Spectrum™ Filter system operating on raw surface water and feeding the reverse osmosis stage of an ultrapure water treatment system. Feed turbidity ranges from 3 to 80 NTU while filtrate is typically less than 0.5 NTU.



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