



COMPETITIVE COMPARISON

Filtronics Electromedia System vs. Multicell System

ISSUE	ELECTROMEDIA®	ANTHRA/SAND	NOTES
Media Comparison	Naturally Mined & Processed Proprietary Media	Manganese Oxide Coated Sand	Glauconite is an iron, potassium, alumino-silicate material of marine origin. Filtronics media is a multilayer media comprised of two support layers, two filtration layers, and an anthracite layer. The filtration media is a naturally occurring mineral which is specially processed. The media is both mined and treated in the U.S. All components of the media are NSF 61 certified.
Media Flux Rate	5 to 15 gpm/sf	5 gpm/sf nominal	Efficiency drops significantly when iron concentrations rise above 1 mg/l (3 gpm/sf or less). Electromedia® typically retains flux rates as high as 15 gpm/sf.
Periodic Media Bed Replacement	Not Required	Required Every Three to Seven Years	Anthra/sand filter beds will become expended, allowing contaminant breakthrough, and must be replaced. The duration between replacements is based on water quality. Costs of media replacement can range from thousands of dollars to multiple tens of thousands of dollars. Due to the true adsorptive property of Filtronics Electromedia® and the efficiency of backwash, our media never requires replacement.
Backwash Duration	4 minutes + 1 minute rinse	15 to 20 minutes + 15 minutes rinse	In a 1,000 gpm system the backwash volume from a Filtronics system will be 9,000 gallons vs. 60,000 gallons from an anthra/sand system. At 1,000 gpm and 24/7 operation, the anthra/sand system will produce 1.2+ million gallons more waste water than a comparable Filtronics plant.
Foot Print	Small	Large	A Filtronics Electromedia® system will be 25 to 50% the size of a comparable anthra/sand filtration plant. The footprint of a 3,000 gpm Filtronics system is 40' by 60', including the chemical feed building.

ISSUE	ELECTROMEDIA	ANTHRA/SAND	NOTES
Capital Costs	Equal or Less	Equal or More	If a true “apples to apples” comparison is made using equivalent levels of automation, Filtronics Electromedia® systems will always be less because of the greatly reduced plant size and fewer auxiliary devices.
Backwash Efficiency	High	Low	Third party testing of backwash turbidity shows Filtronics achieves turbidity reductions from well above 450 FTU’s down to 4 FTU’s in four minutes. At four minutes, greensand had not dropped below the 450 FTU level and was still at an unacceptable 32 FTU’s after ten minutes.
Chemical Regeneration	Not Required	Required	Anthra/sand requires chemical regeneration with potassium permanganate, resulting in additional chemical and manpower costs. This is done intermittently, which causes a loss of production due to down time. Or continuously, putting the utility at risk for pink water episodes from overdosing. Potassium permanganate is also a controlled chemical, used in the refining process of illegal drugs.
Surface Wash	Not Required	May be Required	Iron forms a gelatinous layer if backwash intervals exceed 12 hours. This must be broken in anthra/sand systems using a surface wash nozzle array.
Backwash Removal	8 to 12 Hours	24+ Hours	Anthra/sand operators tend towards longer filtration to backwash intervals because of huge anthra/sand backwash volumes and typically manual system interface. This extended backwash interval leads to premature media bed replacement.
Purge cycle	One minute purge	No purge cycle	Filtronics systems use a one minute purge cycle after backwash to remove dirty water from the filter. Multicell systems do not flush the dirty water, resulting in less consistent filtration.
Flow Control	Automatic Flow Control Valves	Unregulated Flow	Filter loading and backwash rates are controlled by flow control valves in Filtronics systems, assuring accurate backwash rates and accurate filter load. Seimens multicell systems typically control flow with butterfly valves, resulting in inconsistent operation.
Valve complexity	20 valves required for 4 vessels	32 valves required for 4 vessels	Filtronics system design requires fewer moving parts, for greater reliability and a longer system life. Filtronics uses NSF approved valves as required in most states.
Vessel Lining	NSF approved Rigorous control of coatings process	2 coats of paint	Filtronics uses only NSF approved coatings as required in most states. Coating is applied and inspected to industry standard specifications for a coating life which often exceeds 35 years.
Energy Savings	Inexpensive to operate Low electrical demand	Often requires air wash	Filtronics systems do not require air wash. This alone can result in a savings of over \$14,000/year in maintenance costs.

ISSUE	ELECTROMEDIA	ANTHRA/SAND	NOTES
Automation	PLC Controlled	Manual Operation or Mechanical Timers Typical	Filtronics' high level of automation reduces operator interface and provides smooth, consistent system operation as well as system safety, alarms, and advanced status reporting. Anthra/sand systems may also be automated using mechanical timers or PLC's but this is not typical given the lack of system differentiation between various anthra/sand manufacturers.
Backwash Disposal Options	Reclaim, Sewer, Evaporation Pond, Drain Field Reclaim better than 100.00%	Sewer, Evaporation Pond, Drain Field	Because the backwash volume is comparatively small, it can be put into a reclaim storage tank for reclaim. Unlike anthra/sand systems with huge backwash volumes which must discharge to a pond, the Filtronics backwash water does not become a surface water source and may, therefore be reintroduced into the system for processing. Solids in this tank will be disposed of every six to twelve months. In a 1,000 gpm 24/7 system, this means an anthra/sand system will waste 21.9 million gallons a year compared to about 1,500 gallons for an Electromedia® based system. If another disposal option is selected, a 1,000 gpm Filtronics system will emit about 33,000 gallons less waste water per day than a comparable anthra/sand plant.
Filter Loading	No Field Conditioning Required	Field Conditioning Required	A Multicell reclaim system would require a 200,000 gallon tank to provide the same level of water savings as a 50,000 gallon tank on a Filtronics System. Electromedia does not require coating or any type of field conditioning. Anthra/sand may require reconditioning over time.
Vessels	ASME	Often Non-Code	Filtronics vessels meet ASME Section IX Code. Seismic and anchorage calculations can be provided upon request.
Chemical Costs	Less	More	Using a 1,000 gpm 24/7 system with 1 ppm iron and .50 ppm of manganese, anthra/sand operating chemical costs (excluding regeneration) will be \$14,979 per year (based on 22.8 ppd of KMnO4) or about \$28.50 per million gallons. A corresponding Electromedia® system will cost \$5,459 per year (based on 14.76 gpd of NaOCl and 4.86 gpd of NaHSO3) or approximately \$10.39 per million gallons. The annual cost savings in this scenario is \$9,520 in favor of the Filtronics system.
Backwash to Filtration Ratio	2% or Less	4% or More	A function of backwash volume produced in a given filter run.
Pink Water Complaints	None	Possible	Overfeeding potassium permanganate can cause pink water complaints. Filtronics does not use potassium permanganate as an oxidant and does not regenerate media. Chemical feeds are automatically measured and monitored by the Filtronics PLC using a chlorine residual analyzer (when Cl2 or NaOCl) are used as oxidants.

ISSUE	ELECTROMEDIA	ANTHRA/SAND	NOTES
Disinfection Residual	Typically Inclusive	Must Be Added as an Auxiliary Feed	Using Cl ₂ or NaOCl as the system oxidant, a chlorine free residual may be maintained and monitored through the Filtronics plant. This is performed as a separate and distinct feed which must be added to an anthra/sand system. The expense for this requirement was not factored in the cost comparisons above. system. The expense for this requirement was not factored in the cost
Odor & Taste Control Results	Superb	Inconsistent	Oxidation of sulfides using potassium permanganate requires high levels of chemical energy and time, making anthra/sands effectiveness in solving odor and taste issues problematic. Filtronics systems using Cl ₂ or NaOCl as an oxidant require less chemical energy and time. Also, a small auxiliary feed of NaHSO ₃ or SO ₂ is applied as a catalyst reducing the time needed for the system to easily eliminate rubber taste and rotten egg odors.
Weekly Operator Time	1 Hour or Less	7 Hours or More	The weekly Filtronics operator requirement is a check every three days or so (based on operator's site visit schedule) of system status and the chlorine residual indicator. Chart recorder paper should be changed each week. Anthra/sand operators must check chemical feeds, regeneration requirements, and perform backwashes (usually on a daily basis). The man hour savings over time are significant.
		Limited	All Filtronics systems are fabricated in the company's Anaheim, CA facility prior to shipment. The system valve nest is shipped complete and attached to the filter vessels and system fit is verified. Automation panels are assembled and
Customer Quality Control	Superb	Reliant on Field Inspection	tested. Chemical feed panels are also pre-assembled to insure they are installed properly by the contractor. Typically, anthra/sand manufacturers dropship components to jobsites directly from their suppliers without verifying quality standards.
Customer Satisfaction	High	Varies	Filtronics media performs consistently well for the life of the system producing continually high quality water. Manganese anthra/sand's performance will degrade over time with a gradual slope of increasingly poor effluent quality until breakthrough. Breakthrough indicates the need to replace the media bed. As the anthra/sand media bed nears it's expiration, there will be increasing complaints relative to hot water heater rusting, laundry issues, porcelain & dishwasher stains, and perhaps taste & odor complaints.
Interface Capability	RS-232, Phone Dialers, Radio-Telemetry, SCADA, 0-20 mA signals, Local Relay Contacts	Typically None	Anthra/sand system manufacturers provide the least possible automation to control costs. Though high levels of automation are also possible with anthra/sand systems, they are usually not provided unless specified.