



AVANTech WTModules™ ROM-Series

Reverse Osmosis / Electrodeionization Systems

The ROM-Series combines our ROS and EDM-Series into a single unit operation. The combined system is designed to remove ions, particles and reduce TOC. The ROS section can provide 98% to 99% removal of most ions with an 85% recovery. The EDM unit is designed to polish water with less than 40 micro S/cm, 1 ppm silica, 0.1 ppm iron, 0.02 ppm total chlorine/chloramine, 1.0 ppm of hardness and 0.5 ppm of dissolved oxygen.

Reverse Osmosis Elements

Standard reverse osmosis elements are supplied in 4" or 8" diameters. These elements are designed for brackish (2000 ppm TDS +/-) water applications using an FRP overwrap to support the spirally wound membrane and are rated from 200-600 psig operation. The membrane material is a polyimide thin film composite (TFC). These elements are installed in RO pressure vessels, which may be up to 20' long.

Pressure Vessels

The reverse osmosis elements are installed in horizontal pressure vessels. The pressure vessels are normally arranged in a staged configuration in which the concentrate from the first stage becomes the feed for the next stage. The pressure vessels are of FRP construction and are rated for 200-600 psig as required.

Feed Pump

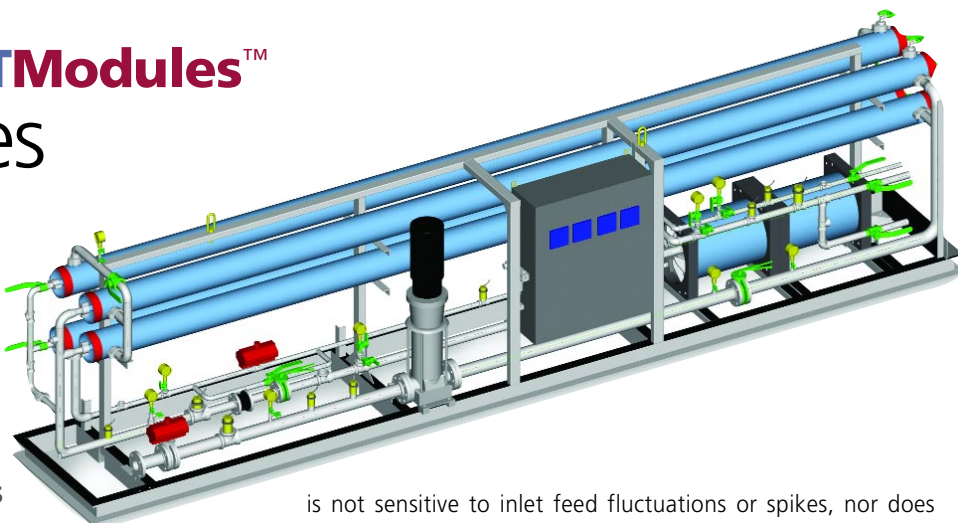
A multi-stage centrifugal pump is designed to increase the feed water pressure. The pump is built using stainless steel on all wetted parts. The pump is sized for the pressure required to maintain specified permeate flow throughout the membrane's useful life.

Electrodeionization

Electrodeionization is a process that polishes the ROS effluent to a purity of >16 megohms. The process utilizes stacks which include charged membranes and mixed bed ion exchange resin. EDS provides continuous demineralization at 90% recovery without the need for regenerant chemicals.

Previous versions of this technology required the concentrate flow to recirculate through the module and sometime inject a salt brine solution to increase concentrate conductivity. The latest EDM technology used by AVANTech no longer requires concentrate recirculation or brine injection.

EDM product quality typically approaches 16 to 18 megohms-cm resistivity, and as low as 5 ppb of silica. The product quality



is not sensitive to inlet feed fluctuations or spikes, nor does it fluctuate over time, as in the exhaustion of traditional deionization units. Reduction of ionizable TOC in an ROM system is also achieved.

Piping

All high pressure piping 2" and less is Schedule 40 stainless steel. All high pressure piping larger than 3" is Schedule 10 stainless steel. All high pressure fittings are welded except where threaded connections are necessary for attachment of sample valves or instruments. All low-pressure piping is constructed of schedule 80 PVC per ASTM standards D-2464, D-2467, D-1784 and the NSF for plastic pipe. CIP cleaning connections are provided. Units will have pipe supports to prevent damage in normal use.

Valves

High pressure valves are stainless steel ball valves. Low pressure valves are PVC diaphragm valves for 2" and smaller piping and butterfly valves for piping 3" and larger. All tubing is polypro.

Controls

All ROM-Series electrical instruments are mounted in a NEMA enclosure, which is mounted on the front of the stainless steel frame. A PLC programmable controller is provided with the ROM-Series system. Instrumentation includes pressure indicator, temperature indicator, conductivity indicator and alarm, low pressure switch and alarm, and flow indicator.

ROM Skid

The ROM skid is constructed from brushed 304 stainless steel. All mechanical and electrical components of the ROM system are mounted, wired, piped, and tubed on the structural stainless steel frame.

Options

- pH adjustment
- Dechlorination feed system
- Antiscalant feed system
- Clean-in-place skid
- Sanitization package
- Heat exchanger
- Cartridge filter
- Polypropylene piping and valves
- Automatic recirculation of the permeate flow
- Stainless steel RO pressure vessels

AVANTech WTModules™

ROM-Series

Reverse Osmosis / Electrodeionization Systems

WTModules™ are AVANTech's line of pre-engineered water treatment systems designed to provide excellent results at low cost in a variety of water treatment applications. With a long list of options, but without the need for custom engineering, WTModules™ is the cost effective solution for many process requirements.

Model	Permeate EDM/ROS Flow (gpm)	Feed EDM/ROS Flow (gpm)	Reject EDM/ROS Flow (gpm)	ROS Array X-X-X-8	Number RO-EDM Modules	Minimum Recovery (%)	Max Power Consumption (600V DC)	Height H (ft)	Width W (ft)	Length L (ft)	Shipping Weight (lbs)	Operating Weight (lbs)
ROM-001	50/56	56/66	6/10	2-1-1	24/1	85-90	20 amp	8	6	23	6,145	9,360
ROM-002	100/111	111/131	11/20	3-2-1	36/2	85-90	40 amps	8	6	23	7,755	12,185
ROM-003	150/167	167/197	17/30	5-3-1	54/3	85-90	60 amps	8	6	23	9,465	16,610
ROM-004	200/222	222/262	22/40	6-4-2	72/4	85-90	80 amps	8	8	23	10,275	18,435
ROM-005	250/278	278/328	28/50	8-4-2	84/5	85-90	100 amps	8	8	23	13,515	21,870
ROM-006	300/333	333/393	33/60	10-5-3	108/6	85-90	120 amps	8	8	23	16,755	25,305

RO Feed Water Specifications

ROS systems are designed to operate using the basic inlet water supply

Total Dissolved Solids	2000 ppm as CaCO ₃ , max.	Barium	0.05 ppm, max.
Total Hardness	2 gpg, max.	Strontium	0.05 ppm, max.
Silica	10 ppm, max.	Aluminum	0.05 ppm, max.
Color (APHA units)	0 max.	Organics	0.1 ppm, max.
Chlorine	0 ppm, max.	TOC	0.1 ppm, max.
Iron & Manganese	0.05 ppm, max.	Temperature	77°F

Feed Water Specifications

Modules must be fed with RO permeate with a conductivity of less than 40 µs/cm.

Feed water source	RO permeate
Feed water conductivity equi, incl CO ₂	<40µs/cm
Temperature	41 - 113°F (4 - 45°C)
Inlet pressure	20-100psi (1.4-7bar)
Maximum free chlorine (as Cl ₂)	<0.02ppm
Iron (Fe)	<0.01ppm
Manganese (Mn)	<0.01ppm
Sulfide (S ⁻)	<0.01ppm
pH	4-11
Total hardness (as CaCO ₃)	<1.0ppm
Dissolved Organics (TOC as C)	<0.5ppm
Silica (SiO ₂)	<1.0ppm

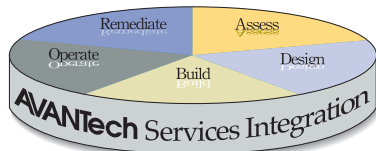
Typical Module Performance

Operating Parameters

Recovery	90-95%
Flow rate	
Minimum	25.0 gpm (5.7 m ³ /hr)
Nominal	50.0 gpm (11.4 m ³ /hr)
Maximum	75.0 gpm (75 m ³ /hr)

Product Water Quality

Product Resistivity:	>16 megohm-cm
Note: Actual performance may be determined using the IP-Pro projection program	
SiO ₂ removal	90-99% depending on feed conditions



Design/Build/Operate AVANTech's approach to systems integration makes us uniquely qualified to provide turnkey service. Our broad range of services enables us to lend our expertise to an entire project—from planning through commissioning and beyond, including operational and remedial assistance needs. *Call us today for assistance with your project.*

