VANTAGE® UFI ULTRAFILTRATION SYSTEMS

Vantage® UFI ultrafiltration systems from Evoqua Water Technologies offer a robust system designed to remove suspended solids and organic impurities from a variety of different water streams.

Ultrafiltration (UF) is quickly becoming the process of choice over conventional technology for the following reasons:

- Superior protection of downstream equipment (i.e. RO systems) to reduce fouling and extend equipment life
- UF membranes provide a physical and verifiable barrier to remove suspended solids
- Consistent quality regardless of feed water conditions
- SDI's typically less than < 2
- Smaller footprint by replacing multiple conventional treatment steps into one filtration step
- Fewer chemicals with less waste, resulting in lower operating costs

MEMBRANE DETAIL

Multibore® ultrafiltration (UF) membrane technology combines seven single capillaries into one, durable membrane fiber. This construction significantly enhances the physical strength and reliability of the membrane, virtually eliminating fiber breakage. With nominal pore size of 0.02 microns, the UF membrane efficiently removes turbidity, particulates, bacteria and pathogens delivering consistently high-quality water, independent of changes in the raw water quality. The modified polyethersulfone (PES) membrane is durable over a wide pH range and highly resistant to fouling by organic matter.

Evoqua Water Technologies offers two options of fiber diameters (0.9 mm and 1.5 mm fiber) that are optimized for your feed water. In general terms, the 0.9 mm fiber is used for source waters with average turbidities < 50 NTU (peak 100 NTU). The 1.5 mm fiber is used on higher turbitity waters (average > 50 NTU, peak 250 NTU) or for backwash waste recovery (water savings) applications.

MODULE DETAIL

At the heart of the Vantage UFI system is the Vantage LPU (low pressure ultrafiltration) module. Multibore fibers are bound together to form a filter module encapsulated into an economical low-pressure PVC housing. The unique design of the module reduces external piping and pipe supports by integrating the feedwater manifolds into the end cap of each module. Through an annular gap between the shell and distribution pipe, filtrate is collected or backwash is introduced into the module. This results in a nearly constant radial velocity across the module diameter leading to:

- Minimized fouling due to an efficient backwash impulse over the total module cross section
- Guaranteed module integrity since no o-rings are used to seperate the feed from the filtrate side
- Minimized process related movements thereby reduced mechanical strain on the fibers and maximized life expectancy

Vantage®UFI System Mid-Range Skid (12 module skid)

Vantage®UFI System Large-Range Skid (48 module skid)

VANTAGE® UFI SYSTEM CONFIGURATION

Vantage® LPU modules are manifolded together into racks and combined with pumps and controls to form a Vantage UFI system.

Vantage UFI systems are available in six models – 4, 8, 12, 24, 36 and 48 module racks. Additional configurations provide up to four racks (i.e. 4 x 24 module racks). Additionally, systems are available with:

- Evoqua or Allen-Bradley control packages with HMI touch screen interface
- Manual/auto backwashing strainer options
- Completely automated backwash and chemical-enhanced backwash capabilities
- VFD-controlled feed pumps for ease of operation and energy savings
- Completely skidded packages with short lead times

VANTAGE UFI MID RANGE SYSTEMS

Mid-range UFI systems (4, 8 and 12 module rack) are designed to treat flow rates from 13.5 to 61 m^3/hr (60 to 270 gpm).

Mid-range Vantage UFI systems include all major components (control panel, membrane modules, feed pump, strainer(s), backwash pump, instrumentation, valves and piping) mounted on a single a skid assembly. The skids are designed to provide maximum support and protection of UFI system components while allowing access for maintenance and operation.

VANTAGE UFI LARGE RANGE SYSTEMS

Large-range UFI systems (24, 36 and 48 module racks) can treat flow rates of over 225 m^3/hr (1,000 gpm), and consist of four seperate assemblies:

- Single feed water pump and pre-strainer skid
- Single backwash/chemical injection pump skid
- Module rack skid(s)
- Main system control panel (with leg kit)

Large-range UFI systems can be ordered with the following configurations:

- 24 Module racks can be ordered with up to four (4) skids
- 36 and 48 module racks can be ordered with up to two (2) skids

Each skid has a carbon steel frame with an industrial coating to support the major system components. These skids are designed to provide maximum support and protection of UFI system components while allowing access for maintenance and operation.

The feed water pump skid contains a motor starter/remote I/O panel, auto-backwashing strainer, instrumentation, pressure relief protection, valves and piping. The backwash water pump skid contains a control panel, chemical injection pumps, instrumentation, pressure relief protection, valves and piping. The module skid contains a control panel, membrane modules, flow controls, instrumentation, valves and piping.

Each Vantage UFI large range system contains a loose-shipped main control panel that interfaces with remote I/O panels located on the system pump and module rack skids.

VANTAGE UFI SYSTEM SPARE PARTS

Evoqua Water Technologies also offers standard spare parts kits and a variety of service packages for Vantage UFI systems. Because critical parts come from Evoqua, the original manufacturer, you will experience minimal downtime with less time spent trying to find replacements. We offer standard spare parts kits, including:

- Mechanical (includes module parts)
- Skid Electrical
- Electrical

VANTAGE UFI SYSTEM REMOTE MONITORING AND SERVICE

For even greater peace of mind, Evoqua Water Technologies offers service contracts to keep you up and running. Every standard Vantage UFI system is equipped with 24/7 remote monitoring capabilities, and our preventative checks save you time and money. All Vantage UFI units include the necessary Evoqua Link2Site® hardware for customer service connection (sold seperately). In order to activate Link2Site remote monitoring services, contact your local Evoqua service branch for availability in your region, subscription fees and/or service contract options to fit your needs.

MID RANGE VANTAGE℠ UFI SYSTEM OVERVIEW

Model	Product Flow Rates, m^3/hr/gpm			
	Nominal Flow at 59 LMH (35 GFD) Flux		Nominal Flow at 85 LMH (50 GFD) Flux	
	LPU MODULE XL 0.9 mm MB 60	LPU MODULE XL 1.5 mm MB 40	LPU MODULE XL 0.9 mm MB 60	LPU MODULE XL 1.5 mm MB 40
UFI04	14.3/63	9.6/42	20.4/90	13.6/60
UFI08	28.6/126	19/84	40.7/179	27/119
UFI12	42.7/188	28.4/125	61.1/269	40.6/179

LARGE RANGE VANTAGE℠ UFI SYSTEM OVERVIEW

Model	Product Flow Rates, m^3/hr/gpm*			
	Nominal Flow at 59 LMH (35 GFD) Flux		Nominal Flow at 85 LMH (50 GFD) Flux	
	LPU MODULE XL 0.9 mm MB 60	LPU MODULE XL 1.5 mm MB 40	LPU MODULE XL 0.9 mm MB 60	LPU MODULE XL 1.5 mm MB 40
UFI24D1_	85.6/377	57/251	122/538	81/358
UFI24D2_	171/754	114/502	245/1077	163/716
UFI24D3_	257/1131	171/753	367/1615	244/1074
UFI24D4_	342/1507	228/1004	489/2153	325/1432
UFI36D1_	128/565	85/376	184/808	122/538
UFI36D2_	257/1131	171/752	367/1615	245/1076
UFI48D1_	171/754	114/502	245/1077	163/716
UFI48D2_	342/1507	228/1004	489/2153	325/1432

* Product flow and flux rates listed above are based on the XL 0.9 mm and 1.5 mm modules, respectively and are established as a guideline. Performance when operating within these parameters varies based on feed water conditions. Under certain conditions, operation outside of these limits may be possible. Specific projections for each water condition must be run for each individual application to ensure proper performance.

FEED WATER GUIDELINES AND LIMITATIONS[1]

Feed Water Turbidity (NTU)	0-50 NTU Average, 100 NTU Peak (0.9 mm fiber) 50-160 NTU Average 250 NTU Peak (1.5 mm fiber)
TOC[2]	< 20 mg/L
pH	3-10
Oil and Grease	< 3 mg/L
Hydrogen Sulfide	< 0.2 mg/L
Fe/Mn	5 mg/L/1 mg/L (must be in suspended solids form)
Cationic Polymers	Non Detectable

[1] If any of the feed water parameters are not within the limits given, consult Evoqua Water Technologies for application assistance.

[2] Pretreatment by adding coagulants upfront of the UF may be required with feedwaters containing organics (TOC/DOC). Contact a Evoqua Water Technologies Application Engineer to determine if the optional coagulation dosing system is required.

NOMINAL DESIGN PARAMETERS

Mid-Range Configuration	4, 8 or 12 module
Large Range Configuration # of Modules per skid – # of Module Skids	24–1, 24–2, 24–3, 24–4; 36–1, 36–2; 48–1, 48–2
Inlet Pressure	0.34 bar (5 PSIG)
Inlet Temperature	20 °C (68 °F)
System Recovery	85 - 93% (typical)
Product Pressure	0.7 bar (10 PSIG)

PARAMETERS NOT TO EXCEED*

Inlet Temperature	2 - 40 °C (36 – 104 °F) Avoid abrupt changes in temperature (>1 °C/minute)
pH (Operation)	3 – 10 (1 – 13 for cleaning)
Inlet Pressure	0.7 bar (10 PSIG)
Transmembrane Pressure	
Filtration	0.1 - 1.5 bar (1.5–20 PSI)
Backwash	0.3 - 3.0 bar (5-40 PSI)
Ambient Conditions	
Temperature	2 – 40 °C (36 – 104 °F) Maximum
Humidity	Non-condensing conditions up to 90%
Exposure	Protect from sunlight and other UV sources

* If any of the feed water parameters are not within the limits given, consult Evoqua Water Technologies for application assistance.

DESCRIPTION

	Vantage® UFI Mid Range System		Vantage® UFI Large Range System
	Plus	Deluxe	Deluxe
General			
Number of Skids	1	1	3 - 7
Controls/Operator Interface	PLC/Color Touch Screen	PLC/Color Touch Screen	PLC/Color Touch Screen
Separate Remote I/O Panels and MCP			X
VFD Controlled Feed Pumps	X	X	X
Dual Manual Backwash (BW) Strainers	X		
Automatic BW Strainers		X	X
Optional (0.9 and 1.5 mm fiber diameters)	X	X	X
Instrumentation			
Mag Flow Meter (Feed)	X	X	X
Mag Flow Meter (BW)	X	X	X
Low/High Pressure Switches	X	X	X
Pressure Transmitters for TMP	X	X	X
Pressure Gauges	X	X	X
Feed Temperature	X	X	X
Feed/BW pH	X	X	X
Feed Water Turbity	X	X	X
Optional Filtrate Water Turbidity	X	X	X
Standard Options			
Chemical Enhanced Backwash Systems (CEB)	3	3	3
Auto High Point Air Bleed	X	X	X
Air Hookup for Integrity Testing (manual)	X	X	X
CIP connections	X	X	X
Link2Site® Remote Monitoring Services	enabled	enabled	enabled
Options To Be Ordered Seperately			
Coagulation Dosing Kit	X	X	X
Coagulation Reaction Time Skid (CRTS)	X	X	
Coagulation Reaction Time Tank (CRTT)			X

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