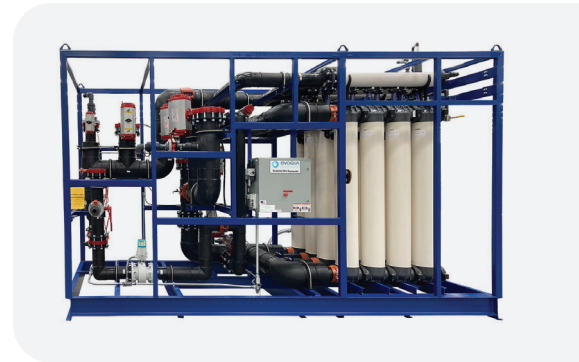


Vantage® UFI Ultrafiltration Systems



Vantage® UFI ultrafiltration solutions 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

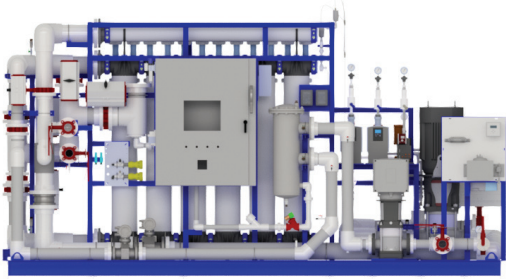
Multibore® ultrafiltration (UF) membrane technology combines seven single capillaries into one, durable membrane fiber. This construction significantly enhances the physical strength and reliability of the membrane, virtually eliminating fiber breakage. With nominal pore size of 0.02 microns, the UF 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 turbidity waters (average > 50 NTU, peak 250 NTU) or for backwash waste recovery (water savings) applications.

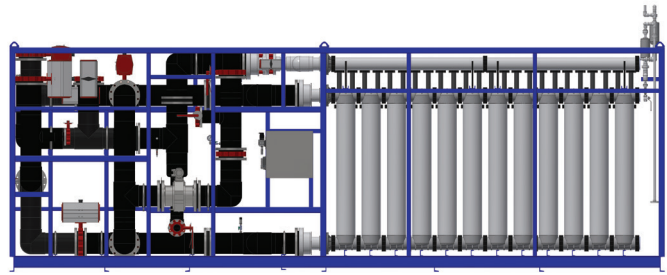
MODULE DETAIL

At the heart of the Vantage UFI system is the inge® (a DuPont brand) 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 separate 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 seven models – 4, 8, 12, 16, 24, 36 and 48 module racks. Additional configurations provide up to four racks (i.e. 5 x 24 module racks). Additionally, systems are available with:

- Allen-Bradley control packages with HMI touch screen interface
- 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 10 to 61 m³/hr (42 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 (16, 24, 36 and 48 module racks) can treat flow rates of over 325 m³/hr (1,400 gpm), and consist of four separate 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:

- 16 and 24 Module racks can be ordered with up to four (4) skids with an optional spare skid (5 total)
- 36 and 48 module racks can be ordered with up to two (2) skids with an optional spare skid (3 total)

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.

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 separately). 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.

UFI SYSTEM OVERVIEW - MID RANGE SYSTEM

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

UFI SYSTEM OVERVIEW - LARGE RANGE SYSTEM

Model	Product Flow Rates, gpm/m ³ per hour*			
	Nominal Flow at 35 (XL 0.9 MB 80 WT) / 40 (XL 1.5 MB 50 WT) GFD Flux		Nominal Flow at 50 GFD Flux	
	XL 0.9 MB 80 WT	XL 1.5 MB 50 WT	XL 0.9 MB 80 WT	XL 1.5 MB 50 WT
UFI16D1_	335/76.1	239/54.3	478/108.6	299/67.9
UFI16D2_	670/152.2	478/108.6	956/217.1	598/135.8
UFI16D3_	1005/228.3	717/162.8	1434/325.7	897/203.7
UFI16D4_	1340/304.3	956/217.1	1912/434.3	1196/271.6
UFI24D1_	502/114.1	359/81.5	718/163	448/101.8
UFI24D2_	1005/228.1	717/162.9	1435/325.9	897/203.7
UFI24D3_	1507/342.2	1076/244.4	2153/488.9	1345/305.5
UFI24D4_	2009/456.3	1435/325.8	2870/651.8	1793/407.3
UFI36D1_	753/171.1	538/122.2	1076/244.4	673/152.7
UFI36D2_	1507/342.2	1076/244.4	2153/488.9	1345/305.5
UFI48D1_	1005/228.1	717/162.9	1435/325.9	897/203.7
UFI48D2_	2009/456.3	1435/325.8	2870/651.8	1793/407.3

*Product flow/flux rates listed above are based on the XL 0.9mm and 1.5mm modules, respectively and are established as a guideline. Performance when operating within these parameters varies based on feed water conditions. Under certain conditions, operating 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 LIMITATIONS¹

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.

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.

NOMINAL DESIGN PARAMETERS

Mid-Range Configuration	4, 8 or 12 module
Large Range Configuration # of Modules per skid - # of Module Skids	16-1, 16-2, 16-3, 16-4; 24-1, 24-2, 24-3, 24-4; 36-1, 36-2; 48-1, 48-2
Inlet Pressure	0.2-0.68 bar (3-10 PSIG)
Inlet Temperature	20 °C (68 °F)
System Recovery	85 - 93% (typical)
Product Pressure	0.7 bar (10 PSIG)

DESCRIPTION

	Vantage® UFI Mid Range System	Vantage® UFI Large Range System
General		
Number of Skids	1	3-8
Controls/Operator Interface	PLC/Color Touch Screen	PLC/Color Touch Screen
Separate Remote I/O Panels and MCP		X
VFD Controlled Feed Pumps	X	X
Automatic BW Strainers	X	X
Optional (0.9 and 1.5 mm fiber diameters)	X	X
Instrumentation		
Mag Flow Meter (Feed)	X	X
Mag Flow Meter (BW)	X	X
Low/High Pressure Switches	X	X
Pressure Transmitters for TMP	X	X
Pressure Gauges	X	X
Feed Temperature	X	X
Feed/BW pH	X	X
Feed Water Turbidity	X	X
Optional Filtrate Water Turbidity	X	X
Standard Options		
Chemical Enhanced Backwash Systems (CEB)	3	3
Auto High Point Air Bleed	X	X
Air Hookup for Integrity Testing (manual)	X	X
CIP connections	X	X
Link2Site® Remote Monitoring Services	enabled	enabled
Options To Be Ordered Separately		
Coagulation Dosing Kit	X	X
Coagulation Reaction Time Skid (CRTS)	X	
Coagulation Reaction Time Tank (CRTT)		X



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