As included as Option 2C in Moff MacDonald "Detailed Feasibility Study of Alternatives to Land Treatment - Dec 2014

GE Power & Water
Water & Process Technologies

Fact Sheet

Z-PAK Pressurized UF Systems

ZeeWeed* 1500 Ultrafiltration for 400 to 4000 gpm (6 MGD)

Description and Use

Versatile and reliable, the Z-PAK pressurized ultrafiltration system - featuring the ZeeWeed 1500 membrane - is ideally suited for use in numerous applications including drinking water treatment, tertiary filtration and RO pre-treatment. Compared to granular filter media, ZeeWeed membranes produce superior water quality and are virtually unaffected by variable raw water quality - all at a cost comparable to conventional filtration technology.

Benefits

- The ZeeWeed 1500 membrane has a 0.02 µm nominal pore diameter - for optimal removal of particulates, bacteria and viruses. Its PVDF chemistry gives mechanical strength and chemical resistance.
- Z-PAK's modular mechanical and electrical design of membrane racks and pump skids provides tremendous design flexibility while minimizing site installation.
- Z-PAK has a large flow range – 300 gpm for 1 train up to 4000 gpm for 4 trains, and allows high recoveries (up to 97% with 2 stages).
- Z-PAK operates automatically (including membrane integrity tests, cleans and neutralization. The Z-PAK membrane rack makes it easy to monitor and maintain membrane performance.
- Z-PAK is designed with high quality equipment and materials to ensure long term, robust performance. Equipment is well laid out for ease of access.
- Z-PAK has a slim, low profile to fit in buildings with low ceilings and tight spaces.

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Options Available

- Duplex CIP and Backpulse equipment with on-skid VFDs (standard is single CIP/BP)
- Membrane Integrity Test (MIT) and LRV
- Air Compressor(s) & drier(s)
- Laser permeate turbidity
- Chemical Cleaning chemicals
- CIP neutralization
- Feed Turbidity meter
- Pre-treatment (enhanced coagulation, oxidation, & pH adjustment)
- Bleed and Block Valves
- Permeate storage tank

Instrumentation

Flow	Feed, Backwash, CIP
Turbidity	Permeate
Pressure	Feed, Permeate, MIT option
Level	Permeate, CIP Tanks
pH	CIP
Chlorine	CIP

Typical Permeate Quality

Recovery Range (single stage)	90-95%
Bacteria, *Giardia, Cryptosporidium*	≥4-log removal
Iron	≤0.05mg/L¥
Manganese	≤0.02 mg/L¥
TSS	≤0.1 mg/L
TOC	50-90% removal¥0
Arsenic	<5µg/L¥
Color	<5PCU¥0

¥ Pretreatment required
0 dependent on water quality

Membrane Modules

Membrane	ZeeWeed 1500 Pressurized, Outside-In
Surface area	600 ft²
Pore size	Ultrafiltration, 0.02 micron nominal
Chemistry	PVDF

Strainer

Manufacturer	Boll, automatic self-cleaning
Mesh Size	200 micron wire mesh
Filter material	Stainless Steel

Materials of Construction

Low Pressure Piping	PVC, 316 SS
Air Piping	316 SS
Skid Frames	Epoxy coated Carbon Steel

Lifecycle Services with Lifetime Support

- Most extensive service team in the industry
- Insight remote monitoring
- 24/7 technical support, free of charge during business hours.
- Upgrades to help you advance with GE's technology

System Parameters	
Membrane Type	Pressurized Outside-In Hollow Fibre Ultrafiltration Membrane
Membrane Name	ZW1500, 600 ft^2
Number of Trains	1 to 4
Flow Range	400 gpm to 4000 gpm (up to 5 MGD)
Operating Temperature Range	32 to 104°F (0 to 40°C)
Customer Feed Pressure	5 psi (35 kPa)
UF Permeate Pressure	10 psi (70 kPa)
PLC/HMI on Master Control Panel	Allen Bradley CompactLogix with Panelview 1250 HMI
Remote I/O panel locations	Process skid(s), Ancillary (CIP) skid
Communication protocol	Flex I/O Ethernet with ring topology
Power	480/600 VAC, 3-phase, 60Hz
Control Circuit	120VAC, Single phase 24VDC

Process skid model	Z-PAK 400	Z-PAK 600	Z-PAK 800	Z-PAK 1100
Maximum Permeate flow rate	400 gpm	600 gpm	800 gpm	1100 gpm
Flush Flow Limit	500 gpm	630 gpm	900 gpm	1300 gpm
Automated Strainer	200 micron mesh	200 micron mesh	200 micron mesh	200 micron mesh
Process Pump Motor	400 gpm @65 psig/ 30 HP	600 gpm @65psig/ 40 HP	800 gpm @65 psig/ 60 HP	1100 gpm @65 psig/ 60 HP
Skid Length/Width/Height	138/65/116 in.	138/65/116 in.	146/71/118 in.	146/71/118 in.
Skid Shipping/Operating Weight	4800 / 5400 lbs	4800 / 5400 lbs	4900 / 6400 lbs	4900 / 6400 lbs
Max train size at low flux (10GFD)	36 membranes	48 membranes	72 membranes	96 membranes
Max train size at high flux (55 GFD)	24 membranes	36 membranes	48 membranes	60 membranes
Connections				
Feed	6 in. flange		8 in. flange	
UF permeate	6 in. flange		8 in. flange	
Backpulse	6 in. flange		6 in. flange	
CIP feed	4 in. flange		6 in. flange	
CIP return	4 in. flange		6 in. flange	
Air	6 in. flange		6 in. flange	
Membrane Integrity Test (MIT)	1 in. victaulic		1 in. victaulic	
Waste	8 in. victaulic		10 in. victaulic	

Membrane Rack Models	24 membrane rack	36 membrane rack
Skid Length, Width, Height	90 / 58 / 99 inches	129 / 58 / 99 inches
Skid Shipping Weight (no membranes)	2140 lbs	3460 lbs
Operating Weight (with membranes)	4600 lbs	7500 lbs
Feed header	8" victaulic, 316 SS	
Air header	6" victaulic, , 316 SS	
Waste (reject) header	10" victaulic, 316 SS	
Permeate header	8" victaulic, 316 SS	
Possible train sizes	24, 36, 48, 60, 72, 84 and 96	

Ancillary skid(s) Either separate or shared backpulse and CIP	For 24 membrane train	For 36 membrane train	For 48 membrane train	For 72 membrane train	For 96 membrane train
Backpulse (BP) pump(s)	192 gpm @50 psig/10 HP	288 gpm @50 psig/15 HP	384 gpm @50 psig/20 HP	576 gpm @50 psig/30 HP	768 gpm @50 psig/40 HP
CIP pump(s)	120 gpm @13 psig/2 HP	180 gpm @13 psig/3 HP	240 gpm @13 psig/5 HP	360 gpm @13 psig/5 HP	480 gpm @13 psig /7.5 HP
CIP heater	25 kW	50 kW	50 kW	50 kW	75 kW
CIP connections	4 in. flange	4 in. flange	4 in. flange	6 in. flange	6 in. flange
BP connections	4 in. flange	6 in. flange	6 in. flange	6 in. flange	8 in. flange
Single ancillary dimensions (L/W/H)	100/59/109 in	100/59/90 in	100/59/90 in	110/68/89 in	113/68/89 in
Single ancillary weight (shipping/operating)	3950 lbs 4200 lbs	4750 lbs 5300 lbs	4850 lbs 5400 lbs	6700 lbs 7700 lbs	7750 lbs 9000 lbs
Duplex BP dimensions (L/W/H)	98/48/94 in	120/62/99 in	120/62/99 in	116/62/99 in	133/68/92 in
Duplex BP weight (shipping/operating)	2550 lbs 2700 lbs	3450 lbs 3800 lbs	3450 lbs 3800 lbs	4450 lbs 5100 lbs	5250 lbs 6350 lbs
Duplex CIP dimensions (L/W/H)	98/58/91 in	98/58/91 in	98/58/91in	117/69/91 in	117/69/91 in
Duplex CIP weight (shipping/operating)	2600 lbs 3150 lbs	2600 lbs 3150 lbs	3500 lbs 3750 lbs	3650 lbs 4700 lbs	4000 lbs 5550 lbs
CIP Tank Diameter	64 in	64 in	64 in	90 in	90 in
CIP Tank Height	104 in	104 in	104 in	131 in	131 in
Air compressor and Blower					
Air Blower motor	72 DCFM@ 15 HP	108 DCFM@ 20 HP	144 DCFM@ 25 HP	216 DCFM@ 40 HP	288 DCFM @ 50 HP
Air Compressor motor, receiver	22.6 ACFM@ 7.5 HP, 1800 rpm	22.6 ACFM@ 7.5 HP, 1800 rpm	22.6 ACFM@ 7.5 HP, 1800 rpm	22.6 ACFM@ 7.5 HP, 1800 rpm	22.6 ACFM@ 7.5 HP, 1800 rpm
Air Dryer	75 CFM, 120 VAC				100CFM, 120VAC

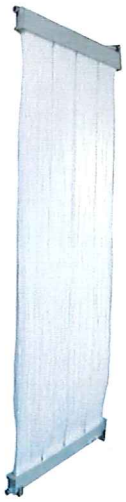
As used in Current Rotorua WWTP - MBR Plant
J.W. Bradley 7/5/2015

GE Power & Water
Water & Process Technologies

Fact Sheet

ZeeWeed* 500D Module

Immersed Hollow-Fiber Ultrafiltration Technology



Module Type	WW	DW
Application	Membrane Bioreactor	All Other Applications
Nominal Membrane Surface Area	340 ft² (31.6 m²)	340 ft² (31.6 m²) 440 ft² (40.9 m²)
Module Dimensions		
Height	2,198 mm (86.4")	
Width	844 mm (33.2")	
Depth	49 mm (1.9")	
Module Weight		
Max. Shipping Weight (crated)	26 kg (58 lb)	28 kg (62 lb)
Lifting Weight (varies with solids accumulation)	26 – 74 kg (58 -163 lb)	30 - 74 kg (66 -163 lb)
Membrane Properties		
Material	PVDF	
Nominal Pore Size	0.04 micron	
Surface Properties	Non-Ionic & Hydrophilic	
Fiber Diameter	1.9 mm OD / 0.8 mm ID	
Flow Path	Outside-In	
Operating Specifications		
TMP Range	- 55 to 55 kPa (- 8 to 8 psi)	-90 to 90 kPa (-13 to 13 psi)
Max. Operating Temperature	40°C (104°F)	
Operating pH Range	5.0 – 9.5	
Cleaning Specifications		
Max. Cleaning Temperature	40°C (104°F)	
Cleaning pH Range	2.0 – 10.5	
Max. Cl_2 Concentration	1,000 ppm	

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