



Acceptable membrane filters

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We will accept the membrane filters listed below for piloting or other state-approved field evaluations (WAC 246-290-676). Lab or field studies showed that these filters remove acceptable levels of *Cryptosporidium* (or acceptable surrogate) and meet the required material performance standard (WAC 246-290-220(1)).

Applicable Requirements: By accepting these membrane filters, we do not diminish the need to conduct a pilot test or other state-approved field evaluation. You must still do a predesign study to establish the best way to produce satisfactory finished water quality and to justify your choice of filtration technology (WAC 246-290-250).

Requirements that apply to each membrane filter listed below:

- ◆ **Disinfection** (WAC 246-290-662).
- ◆ **Turbidity performance** (WAC 246-290-660): ≤ 0.10 NTU in 95 percent of all four-hour measurements taken each month from the combined filter effluent, never to exceed 1.0 NTU.
- ◆ **Turbidity monitoring** (WAC 246-290-664): Continuous on the combined filter effluent.
- ◆ **Indirect integrity monitoring** (particle counts or high-resolution turbidity) on each membrane unit according to product-specific approval.

Refer to the manufacturer's product-specific information prior to design.

Manufacturer	Model	Pathogen Removal Credit (Log) ¹			Flux Rate, Max @ 20C (gal/sf/day)	Trans-membrane Pressure ² Max	Initial Test Pressure Min	Quality Control Release Value ³	Direct Integrity Test Default Upper Control Limit (UCL) ^{4,5}
		Crypto	Giardia	Viruses					
GE (Zenon)	ZeeWeed 500	3.0	3.0	0	APPROVED FOR EXISTING USES ONLY				
GE (Zenon)	ZeeWeed 1000 V4	3.0	3.0	0	60	-13 psi	12.5 psi	0.20 psi/min	0.60 psi/min
GE (Zenon)	ZeeWeed 1500	3.0	3.0	0	100	45 psi	13.6 psi	0.070 psi/min	0.10 psi/min
GE(Zenon)	ZeeWeed 1500-600	3.0	3.0	1.0	90	45 psi	13.7 psi	0.179 psi/min	0.25 psi/min
GE (Zenon)	Homespring	3.0	3.0	0	4.5 gpm cont. or 11 gpm peak	40 psi	15.0 psi	Under Review	0.36 psi/min
Pall (Trojan)	Microza USV-6203	3.0	3.0	0	120	43.5 psi	25.0 psi	<1 bubble at 29 psi, 1 minute hold time	0.33 psi/min
	Microza UNA-620A								
Pall (Trojan)	Ultra60 MSA-620A	4.0	4.0	0	120	43.5 psi	18.8 psi	0.01 psi/min	Site-specific ⁶

¹For models with a default upper control limit, we may grant greater *Cryptosporidium* and *Giardia lamblia* removal on a case-by-case basis with more stringent control limits.

²Negative pressure indicates that the membrane system operates under a vacuum.

³The manufacturer's quality control test criteria to ensure that each module shipped from the factory achieves the same *Cryptosporidium* removal as those that were independently challenge tested.

⁴Direct integrity test performed at least daily and before returning a skid to service after work has been done on the unit or it has been off-line. You must perform a direct integrity test immediately if the system exceeds an indirect integrity-monitoring threshold for 15 or more minutes. You also must perform a direct integrity test once every 4 hours as long as the system continues to exceed the threshold. The indirect integrity monitoring threshold for all listed membranes is either:

- Particle Counts (size >2 um): 30 counts /mL
- Turbidity: 50 mNTU (0.05 NTU)

⁵Membrane unit shuts down automatically if the direct integrity test exceeds the UCL or the Log Removal Value (LRV) is less than 3.0. If the membrane unit shuts down based upon the LRV value, you must use a DOH-approved algorithm. Consult with the regional engineer on the LRV approval process.

⁶The UCL must be submitted for DOH approval based on site-specific conditions. UCL must be set for at least a design log removal credit of 3.0 log and for no more than the maximum log removal credit of 4.0.

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		Crypto	Giardia	Viruses					
Siemens (Evoqua)	M10C Part 111008	3.0	3.0	0	APPROVED FOR EXISTING USES ONLY				
Siemens (Evoqua)	S10N – Part 119211	3.0	3.0	0	80	22 psi	14.0 psi	9.0 sec/mL	0.39 psi/min
Siemens (Evoqua)	L10N – Part 111315	3.0	3.0	0	155	22 psi	14.0 psi	9.0 sec/mL	0.20 psi/min
Siemens (Evoqua)	L20N – Part 11062	3.0	3.0	0	155	22 psi	14.0 psi	6.0 sec/mL	0.57 psi/min
Seccua	Phoenix: Module DizzerXL0.9MB60	3.0	3.0	0	59	36 psi	21.75 psi	0.145 psi/min	0.25 psi/min
Seccua	Virex: Module – SeccuMem Pro 1000	3.0	3.0	0	53	36 psi	22.4 psi	0.007 psi/min	0.35 psi/min
Westech/Polymem	UF 120 S2	3.0	3.0	0	60	29 psi	16.3 psi	0.49 psi/min	0.90 psi/min
Westech/Toray	HFU 2020N	3.0	3.0	0	100	29 psi	18.2 psi	0.029 psi/min	0.39 psi/min
Westech/Toray	HFUG 2020AN	4.0	4.0	0	120	29 psi	17.44 psi	0.029 psi/min	site-specific ⁶

For more information

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