

**California Surface Water Treatment Rule  
Alternative Filtration Technology - Membrane Filtration  
SWRCB-DDW Water Treatment Committee - June 2018**

Manufacturer	Model	Type	Pathogen Removal Standards (log credit)			Turbidity Standards		Conditions During Demonstration	
			Virus	Giardia	Crypto	95% of time	Max	Max Flux Lph/m2 (gfd)	Max TMP (psi)
Aquasource	Advent	UF	4, *	4	4	0.1 NTU	0.5 NTU	136 (80)	29
BASF Inge	D5000	UF	3.5, *	4	4	0.1 NTU	0.5 NTU	156 (92)	29
Dow	UF SFX2860	UF	2.5, *	4	4	0.1 NTU	0.5 NTU	102 (60)	30
Evoqua (formerly Siemens, who acquired US Filter)	Memcor PVdF (S10V, L10V, L20V)	UF	1.5, *	4	4	0.1 NTU	0.5 NTU	88 (52)	22
	PVdF	MF	0.5, *	3.5	4	0.1 NTU	0.5 NTU	85 (50)	29
	L10N, L20N, S10N	UF	1, *	4	4	0.1 NTU	0.5 NTU	263 (155)	22 (L10N, L20N) 12.3 (S10N)
	Polypropylene (M10B, M10C, S10T)	MF	0.5, *	4	4	0.1 NTU	0.5 NTU	110 (66.9)	15
MF		0, *	4	4	0.1 NTU	0.5 NTU	160 (93.6)	17	
GE Zenon	Homespring UF211	UF	3.5, *	4	4	0.1 NTU	0.5 NTU	93.4 (55)	20
	ZeeWeed 500 series	UF	2, *	4	4	0.1 NTU	0.5 NTU	85 (49.8)	11.8
	ZeeWeed 1000 V2 & V3	UF	3.5, *	4	4	0.1 NTU	0.5 NTU	93.4 (55)	12 (vac)
	ZeeWeed 1000 V4	UF	1, *	4	4	0.1 NTU	0.5 NTU	102 (60)	13
	ZeeWeed 1500 ZeeWeed 1500-600 CPX	UF	1, *	4	4	0.1 NTU	0.5 NTU	170 (100)	45
Hydranautics	HYDRAcap	UF	4, *	4	4	0.1 NTU	0.5 NTU	119 (69.3)	18
Koch	PMPW	UF	4, *	4	4	0.1 NTU	0.5 NTU	173 (102)	35
METAWATER (NGK)	431011	UF	*	4	4	0.1 NTU	0.5 NTU	(175)	55
Norit X-Flow	S 225	UF	*	4	4	0.1 NTU	0.5 NTU	127.3 (75)	31
	SXL-225	UF	*	4	4	0.1 NTU	0.5 NTU	127.3 (75)	31
Pall	Microza USV 6203 Microza USV 5203 Microza UNA 620A	MF	0.5 *	4	4	0.1 NTU	0.5 NTU	203.7 (120)	43.5
	UNA 620A1	UF	4, *	4	4	0.1 NTU	0.5 NTU	102 (60)	51
Seccua	SeccuMem Pro 1000	UF	1, *	4	4	0.1 NTU	0.5 NTU	90 (53)	36
Toray (Torayfil)	HFS-2020	UF	1.5, *	4	4	0.1 NTU	0.5 NTU	202 (120)	29
	LSU-1515	UF	1.5, *	4	4	0.1 NTU	0.5 NTU	83 (49)	10
Toyobo	Durasep (UPF0860, UPF0870)	UF	1.5, *	4	4	0.1 NTU	0.5 NTU	119 (70)	35
WesTech Polymem	120S2	UF	*	4	4	0.1 NTU	0.5 NTU	45 (27)	21

Note \*: Although virus removal may have been successfully demonstrated and accepted by DDW in the past, each plant is required to provide a minimum of 0.5-log Giardia and 4-log virus inactivation through disinfection. Credit for virus removal cannot be demonstrated on a daily basis currently via pressure decay testing per the USEPA Membrane Filtration Guidance manual.

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			Virus	Giardia	Crypto	95% of time	Max	Max Flux (gfd)	Max TMP (psi)	Source	
Dow	Filmtec SW30HR LE-440i	RO	2	2	2	**	**	**	**	Agua Hedionda Lagoon (WSS available at Poseidon - Carlsbad)	Pathogen removal credit was given based on successful demonstration of 2-log removal of TDS. Data obtained from system permit amendment.
GE	SeaTECH-84	RO	2	2	2	**	**	**	**	Catalina Island Seawater Wells	Pathogen removal credit was given based on successful demonstration of 2-log removal of TDS. Data obtained from system permit amendment.
	Desal DK 5	RO	2	3	5	< 0.1 NTU				Putah South Canal	Data obtained from 2001 AFT Demo Report.

\*\* Note: The RO membranes were permitted on a case by case basis using a successful demonstration study. No conditional acceptance letter was issued.

**Guidance:**

Membrane technologies are considered as "alternative processes", and require demonstrations to DDW that these technologies meet pathogen removal and turbidity standards.

The demonstrations include a pilot plant test, or prior demonstration test by manufacturer or other utility.

The Alternative Filtration Technology (AFT) Tables are thus created to help staff evaluate treatment proposals using membrane technologies.

Membranes that have been pilot tested and conditionally or fully approved are tabulated in the AFT Tables.

Low pressure filtration processes using microfiltration or ultrafiltration membranes are grouped in one table.

High pressure filtration processes using reverse osmosis membranes are grouped in the other table.

Title 22, CCR, Section 64653(f), the demonstration shall be based on a testing of a full scale installation that is treating a water with similar characteristics and is exposed to similar hazards as the water proposed for treatment.

The revised AFT Tables will include for on site demonstrations (RO systems) the locations where the membranes were demonstrated, or indicate the sources used during demonstrations.

Staff engineers should examine the source water characteristics and potential health hazards using the locational information before applying the AFT Tables to the proposed treatment.