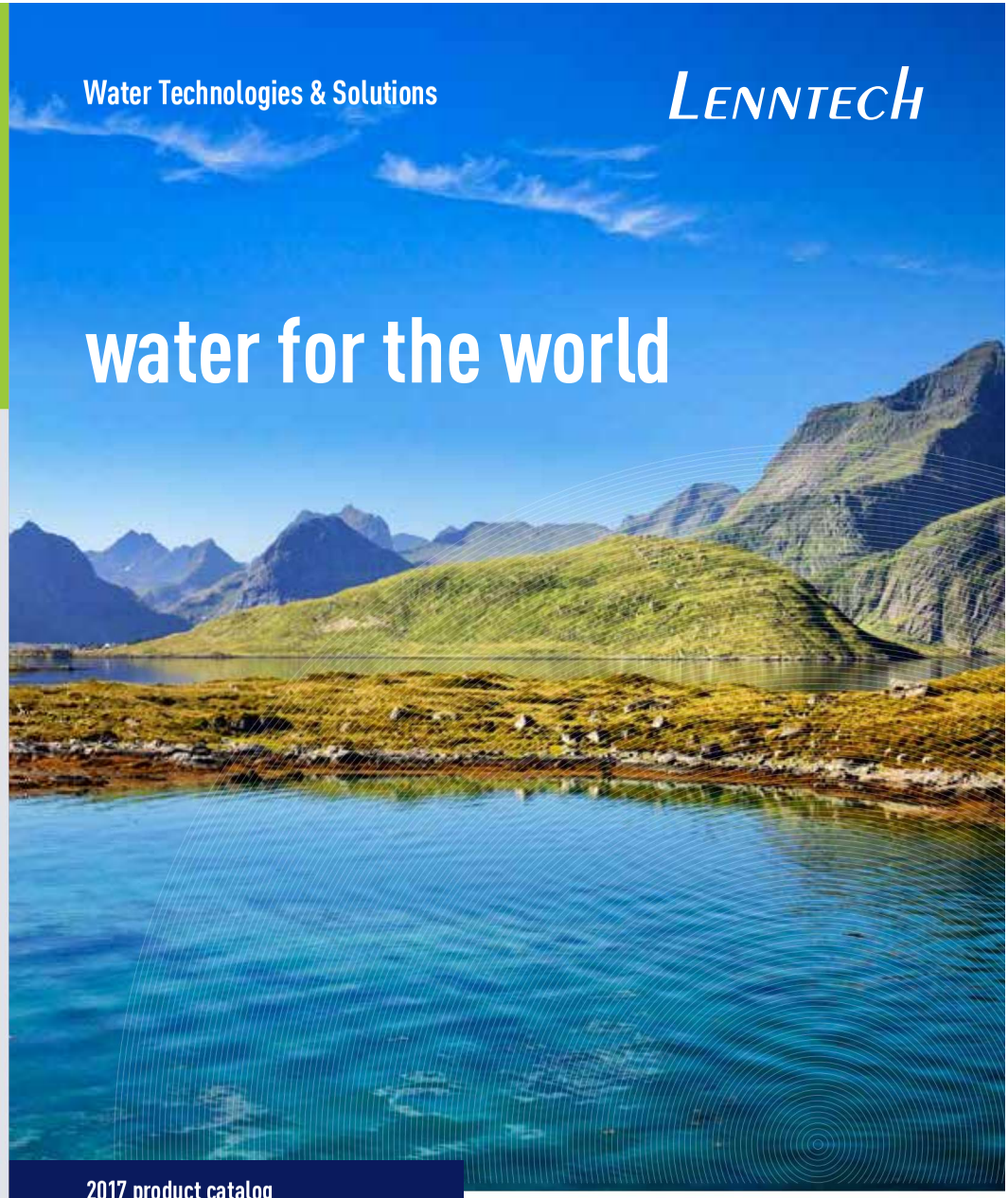
Water Technologies & Solutions

LENNTECH

water for the world



2017 product catalog

ready for the resource revolution

suez

Find a contact near you by visiting www.suezwatertechnologies.com and clicking on "Contact Us."

GEA32879 Jan-17

suez

RO Membranes

Reverse Osmosis membranes are used in systems for brackish and seawater desalination, as well as for process stream concentration and purification.

The A-Series are families of proprietary thin film reverse osmosis membrane elements, characterized by an excellent sodium chloride rejection. The range of membranes covers brackish water and seawater reverse osmosis products

The C-Series family, a triacetate/diacetate blend, has a higher flux and better mechanical stability than standard cellulose acetate. C-Series elements offer an increased chlorine resistance compared to thin film elements.

The S-Series family of proprietary thin-film reverse osmosis membrane elements is characterized by high sodium chloride rejection and a smooth, fouling-resistant membrane surface.

These membrane families are also used in a variety of specialty series of membranes described below. Individual specifications are on the pages that follow.

membrane series	application	typical operating pressure psi	typical operating flux – GFD (LMH)
AD	High Rejection SWRO	800	7–11 (12–19)
AE HR	High Rejection Low Energy SWRO	800	7–11 (12–19)
AG	Standard BWRO	200	10–20 (15–35)
AG FR	Large Spacer for Cleaning Effectiveness	200	10–20 (15–35)
AG HR	Very High Rejection of Monovalent	200	10–20 (15–35)
AG LF	Low Operating Pressure Optimized	200	10–20 (15–35)
AK	Low Pressure BWRO	100	10–20 (15–35)
AK LE	Low Energy for Bev, Residential, and Gen. Industrial	110	10–20 (15–35)
AK HR	Low Pressure BWRO	120	10–20 (15–35)
AP	Ultra Low Pressure, Beverage Applications	70	10–20 (15–35)
CD	Beverage, Chlorine Tolerant	140–400	10–18 (15–30)
CE	Beverage, Chlorine Tolerant	140–400	10–18 (15–30)
CG	Beverage, Chlorine Tolerant	140–400	10–18 (15–30)
SE	BWRO, Process Stream Concentration, Fouling Resistance	100	5–20 (8–35)
SG	BWRO, Process Stream Concentration, Fouling Resistance	100	5–20 (8–35)
Dairy AF	Dairy Processing – Lactose Concentration FDA, EU 1935/2004	200–500	5–20 (8–35)
DuraCon RO1	Sugar Processing and Concentration FDA, EU 1935/2004 S-Series	200–800	5–20 (8–35)
DuraCon RO5	Sugar Purification and Concentration FDA, EU 1935/2004 A-Series	200–800	5–20 (8–35)
Food EGG	Egg Processing, Egg White Concentration FDA, EU 1935/2004 A-Series	200–500	5–20 (8–35)
Industrial RO	Wastewater Stream Concentration A/S-Series	225/425	5–20 (8–35)
OSMO BEV CA	Beverage and Bottled Water Production NSF 61	60–200	10–20 (15–35)
OSMO BEV	Beverage Ingredient Water, Ultra Low Energy NSF61	50–100	10–20 (15–35)
OSMO HR(PA)	Polyamide TFM – BWRO	200	10–20 (15–35)
OSMO USPG	Pharma Grade USP Class VI-121C	200	10–20 (15–35)
MUNI RO HR	Municipal Drinking Water Purification NSF61	200	10–20 (15–35)
Polisher RO	Permeate & Condensate Polishing FDA, EU 1935/200 A-Series	200–500	15–20 (25–35)
VinoCon RO1	Wine & Grape Juice Processing S-Series	200–800	5–20 (8–35)
VinoCon RO3	Wine & Grape Juice Processing S-Series	200–800	5–20 (8–35)
VinoCon RO5	Wine & Grape Juice Processing A-Series	200–800	5–20 (8–35)

AD series

high rejection seawater RO elements

The AD Series, family of proprietary thin film reverse osmosis membrane elements, is characterized by an excellent sodium chloride rejection. AD series is selected when high quality permeate is demanded from seawater that is relatively high in TDS.

AD series new membrane chemistry provides excellent rejection characteristics when operated at seawater operating conditions (pressures exceeding 800 psi (5,516 kPa) and elevated temperatures).

Table 1: Element Specification

membrane	thin-film membrane (TFM*)

model	average permeate flow gpd (m^3/day)[a,b]	average NaCl rejection[a,b]	minimum NaCl rejection[a,b]	typical boron rejection[b]
AD-90	1400 (5.3)	99.8%	99.5%	95.0%
AD-365	6500 (24.2)	99.8%	99.5%	95.0%
AD-400,34	7000 (26.5)	99.8%	99.5%	95.0%
AD-440	7700 (29.2)	99.8%	99.5%	95.0%

[a] Average salt rejection after 24 hours operation. Individual flow rate may vary +20%/-20%.

[b] Testing conditions: 32,000 mg/l NaCl and 5 mg/l boron solution at 800 psi (5,516 kPa) operating pressure, 77°F (25°C), pH 8.0 and 7% recovery.

model	active area ft^2 (m^2)	outer wrap	part number
AD-90	90 (8.4)	Fiberglass	3056651
AD-365	365 (33.9)	Fiberglass	3056652
AD-400,34	400 (37.2)	Fiberglass	3056654
AD-440	440 (40.9)	Fiberglass	3056655

Figure 1a: Element Dimensions Diagram – Male

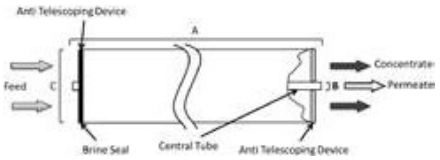


Figure 1b: Element Dimensions Diagram – Female

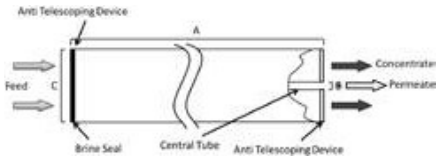


Table 2: Operating and CIP Parameters

Typical Operating Pressure	800 psi (5,516 kPa)
Typical Operating Flux	7–11 GFD (12–19 LMH)
Maximum Operating Pressure	1,200 psi (8,274 kPa)
Maximum Temperature	Continuous operation: 122°F (50°C) Clean-In-Place (CIP): 122°F (50°C)
pH Range	Optimum rejection: 7.0–7.5, Continuous operation 4.0–11.0, Clean-In-Place (CIP): 2.0–11.5
Maximum Pressure Drop	Over an element: 12 psi (83 kPa) Per housing: 50 psi (345 kPa)
Chlorine Tolerance	1,000+ ppm-hours, dechlorination recommended
Feedwater[a]	NTU < 1 SDI < 5

[a] SDI is measured on a non-linear scale using a 0.45 micron filter paper. Additionally, finer colloids, particulates and microorganisms that pass through the filter paper and not measured in the SDI test, will potentially foul the RO element. For performance consistency and project warranty, please use Winflows projection software and consult your Filters with Membranes representative.

Table 3: Dimensions and Weights

model	type	dimensions, inches (cm)			boxed
		A	B[a]	C	weight lbs (kg)
AD-90	Male	40.0 (101.6)	0.75 (1.90) OD	3.9 (9.9)	9 (4)
AD-365	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)
AD-400, 34	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)
AD-440	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)

[a] Internal diameter unless specified OD (Outside Diameter).

AE HR series

high rejection low energy seawater RO elements

The AE HR series of proprietary thin film reverse osmosis membrane elements are characterized by an excellent sodium chloride rejection. AE HR series is selected when high quality permeate is demanded from seawater that is relatively high in TDS.

AE HR series new membrane chemistry provides excellent rejection characteristics when operated at seawater operating conditions (pressures exceeding 800 psi (5,516 kPa).

Table 1: Element Specification

Membrane	Thin-Film Membrane (TFM)

model	average permeate flow gpd (m^3/day)[a,b]	average NaCl rejection[a,b]	minimum NaCl rejection[a,b]	minimum boron rejection[b]
AE-90	2000 (7.6)	99.8%	99.3%	90.0%
AE-400, 34	9000 (34.1)	99.8%	99.3%	90.0%
AE-440	9900 (37.5)	99.8%	99.3%	90.0%

[a] Average salt rejection after 24 hours operation. Individual flow rate may vary +20%/-20%.

[b] Testing conditions: 32,000 mg/l NaCl and 5 mg/l Boron solution at 800 psi (5,516 kPa) operating pressure, 77°F (25°C), pH 8.0 and 10% recovery.

model	active area ft^2 (m^2)	outer wrap	part number
AE-90	90 (8.4)	Fiberglass	3056660
AE-400, 34	400 (37.2)	Fiberglass	3056662
AE-440	440 (40.9)	Fiberglass	3056663

Figure 1a: Element Dimensions Diagram – Male

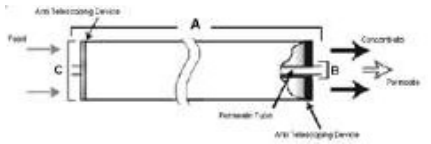


Figure 1b: Element Dimensions Diagram – Female

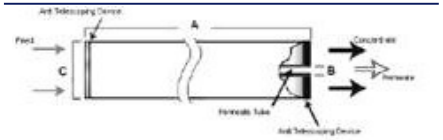


Table 2: Operating and CIP Parameters

Typical Operating Pressure	800 psi (5,516 kPa)
Typical Operating Flux	7–11 GFD (12–19 LMH)
Maximum Operating Pressure	1,200 psi (8,274 kPa)
Maximum Temperature	Continuous operation: 122°F (50°C) Clean-In-Place (CIP): 122°F (50°C)
pH Range	Optimum rejection pH: 7.0–7.5, Continuous operation: 4.0–11.0, Clean-In-Place (CIP): 2.0–11.5
Maximum Pressure Drop	Over an element: 12 psi (83 kPa) Per housing: 50 psi (345 kPa)
Chlorine Tolerance	1,000+ ppm-hours, dechlorination recommended
Feedwater[a]	NTU < 1 SDI < 5

[a] SDI is measured on a non-linear scale using a 0.45 micron filter paper. Additionally, finer colloids, particulates and microorganisms that pass through the filter paper and not measured in the SDI test, will potentially foul the RO element. For performance consistency and project warranty, please use Winflows projection software and consult your Filters with Membranes representative.

Table 3: Dimensions and Weights

model	type	dimensions, inches (cm)			boxed
		A	B[a]	C	weight lbs (kg)
AE-90	Male	40.0 (101.6)	0.75 (1.90)	3.9 (9.9)	9 (4)
AE-400, 34	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)
AE-440	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)

[a] Internal diameter unless specified OD (Outside Diameter).

fouling resistant brackish water RO elements

The A-Series family of proprietary thin-film reverse osmosis membrane is characterized by high flux and relatively high sodium chloride rejection. AG FR brackish water elements are selected when durability and cleaning effectiveness are important.

The AG FR membrane element is specifically designed with a larger feed spacer to enhance feed flow channels, maximizing the element energy efficiency and cleaning efficiency.

Table 1: Element Specification

membrane	thin-film membrane (TFM*)

model	active area ft² (m²)	outer wrap	part number
AG8040F-400 FR, 34	400 (37.1)	Fiberglass	3136931

model	average permeate flow gpd (m³/day)[a,b]	average NaCl rejection[a,b]	minimum NaCl rejection[a,b]
AG8040F-400 FR, 34	11,500 (43.5)	99.5%	99.1%

[a] Average salt rejection after 24 hours operation. Individual flow rate may vary +/-20%.

[b] Testing conditions: 2000 ppm NaCl solution at 225 psi (1551 kPa) operating pressure, 77°F (25°C), pH7 and 15% recovery.

Figure 1: Element Dimensions Diagram – Female

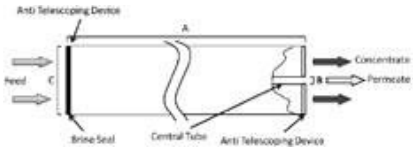


Table 2: Operating and CIP Parameters

Typical Operating Pressure	200 psi (1,379 kPa)
Typical Operating Flux	10–20 GFD (15–35 LMH)
Maximum Operating Pressure	600 psi (4,137 kPa)
Maximum Temperature	Continuous operation: 122°F (50°C) Clean-In-Place (CIP): 122°F (50°C)
pH Range	Optimum rejection: 7.0–7.5, Continuous operation: 4.0–11.0, Clean-In-Place (CIP): 1.0–13.0[a]
Maximum Pressure Drop	Over an element: 12 psi (83 kPa) Per housing: 50 psi (345 kPa)
Chlorine Tolerance	1,000+ ppm-hours, dechlorination recommended
Feedwater[b]	NTU < 1 SDI < 5

[a] Please refer to Cleaning Guidelines Technical Bulletin TB1194.

[b] SDI is measured on a non-linear scale using a 0.45 micron filter paper. Additionally, finer colloids, particulates and microorganisms that pass through the filter paper and not measured in the SDI test, will potentially foul the RO element. For performance consistency and project warranty, please use Winflows projection software and consult your SUEZ representative.

Table 3: Dimensions and Weights

model	type	dimensions, inches (cm)			boxed
		A	B	C	weight lbs (kg)
AG8040F-400 FR, 34	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)

high rejection brackish water RO elements

The A-Series family of proprietary thin-film reverse osmosis membrane is characterized by high flux and high sodium chloride rejection. AG HR brackish water elements are selected when high rejection and operating pressures as low as 200 psi (1,379 kPa) are desired. These elements are recommended for brackish water with salt concentration (TDS) levels between 1,000 and 10,000 mg/l or when very high salt rejection of monovalent ions is required.

Table 1: Element Specification

membrane	thin-film membrane (TFM*)

model	average permeate flow gpd (m³/day)[a,b]	average NaCl rejection[a,b]	minimum NaCl rejection[a,b]
AG-90	2300 (8.7)	99.8%	99.3%
AG-365	10,000 (37.9)	99.8%	99.3%
AG-400	11,000 (41.6)	99.8%	99.3%
AG-400, 34	11,000 (41.6)	99.8%	99.3%
AG-440	12,000 (45.4)	99.8%	99.3%

[a] Average salt rejection after 24 hours operation. Individual flow rate may vary +/-20%.

[b] Testing conditions: 2,000 ppm NaCl solution at 225 psi (1,550 kPa) operating pressure, 77°F (25°C), pH7 and 15% recovery.

model	active area ft² (m²)	outer wrap	part number
AG-90	90 (8.4)	Fiberglass	3056665
AG-365	365 (33.9)	Fiberglass	3056666
AG-400	400 (37.2)	Fiberglass	3056667
AG-400, 34	400 (37.2)	Fiberglass	3056668
AG-440	440 (40.9)	Fiberglass	3056669

Figure 1a: Element Dimensions Diagram – Male

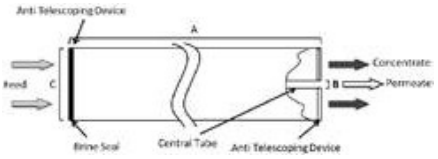


Figure 1b: Element Dimensions Diagram – Female

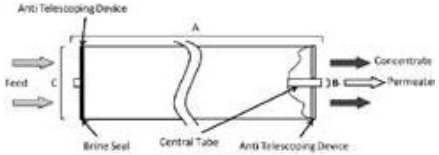


Table 2: Operating and CIP Parameters

Typical Operating Pressure	200 psi (1,380 kPa)
Typical Operating Flux	10–20 GFD (15–35 LMH)
Maximum Operating Pressure	600 psi (4,137 kPa)
Maximum Temperature	Continuous operation: 122°F (50°C) Clean-In-Place (CIP): 122°F (50°C)
pH Range	Optimum rejection: 7.0–7.5, Continuous operation 4.0–11.0, Clean-In-Place (CIP): 1.0–13.0[a]
Maximum Pressure Drop	Over an element: 12 psi (83 kPa)
	Per housing: 50 psi (345 kPa)
Chlorine Tolerance	1,000+ ppm-hours, dechlorination recommended
Feedwater[b]	NTU < 1 SDI < 5

[a] Please refer to Cleaning Guidelines Technical Bulletin TB1194.

[b] SDI is measured on a non-linear scale using a 0.45 micron filter paper. Additionally, finer colloids, particulates and microorganisms that pass through the filter paper and not measured in the SDI test, will potentially foul the RO element. For performance consistency and project warranty, please use Winflows projection software and consult your SUEZ representative.

Table 3: Dimensions and Weights

model	type	dimensions, inches (cm)			boxed
		A	B	C	weight lbs (kg)
AG-90	Male	40.0 (101.6)	0.75 (1.90)	3.9 (9.9)	9 (4)
AG-365	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)
AG-400	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)
AG-400, 34	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)
AG-440	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)