

AD HR Series

High Rejection Seawater RO Elements

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

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

Table 1: Element Specification

Membrane	Thin-film membrane (TFM*)
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Model	Average permeate flow gpd (m3/day) ^{1,2}	Average NaCl rejection ^{1,2}	Minimum NaCl rejection ^{1,2}
AD-90	1500 (5.7)	99.75%	99.3%
AD-365	6000 (22.7)	99.75%	99.3%
AD-400	6500 (24.6)	99.75%	99.3%
AD-400, 34	6500 (24.6)	99.75%	99.3%
AD-440	7100 (26.9)	99.75%	99.3%
AD-1600	26000 (98.4)	99.75%	99.3%

¹Average salt rejection after 24 hours operation. Individual flow rate may vary +25%/-15%.

²Testing conditions: 32,000mg/l NaCl solution at 800psi (5,516kPa) operating pressure, 77°F (25°C), pH7.5 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	400 (37.2)	Fiberglass	3056653
AD-400, 34	400 (37.2)	Fiberglass	3056654
AD-440	440 (40.9)	Fiberglass	3056655
AD-1600	1600 (148.6)	Fiberglass	3056656

Table 2: Operating and CIP parameters

Typical Operating Pressure	800psi (5,516kPa)
Typical Operating Flux	7-11GFD (12-19LMH)
Maximum Operating Pressure	1,200psi (8,274kPa)
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
Feedwater³	NTU < 1 SDI < 5

³SDI 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.

Figure 1a: Element Dimensions Diagram – Male

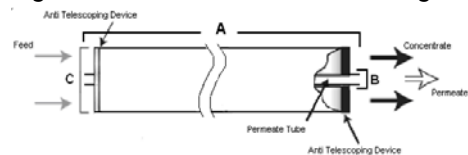
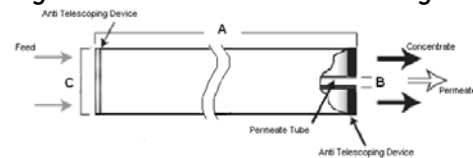


Figure 1b: Element Dimensions Diagram – Female



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Table 3: Dimensions and Weights

Model ¹	Type	Dimensions, inches (cm)			Boxed Weight lbs (kg)
		A	B ²	C	
AD-90	Male	40.0 (101.6)	0.75 (1.90)	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	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)
AD-1600	Female	40.0 (101.6)	3.000 (7.620)	16.0 (40.6)	120 (54)

AG HR Series

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 10,000mg/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) ^{1,2}	Average NaCl rejection ^{1,2}	Minimum NaCl rejection ^{1,2}
AG-90	2200 (8.3)	99.8%	99.3%
AG-365	9600 (36.3)	99.8%	99.3%
AG-400	10500 (39.7)	99.8%	99.3%
AG-400, 34	10500 (39.7)	99.8%	99.3%
AG-440	11500 (43.5)	99.8%	99.3%
AG-1600	42000 (159.0)	99.8%	99.3%

¹Average salt rejection after 24 hours operation. Individual flow rate may vary +25%/-15%.

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

Model	Active area ft ² (m ²)	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
AG-1600	1600 (148.6)	Fiberglass	3056670

Table 2: Operating and CIP parameters

Typical Operating Pressure	200 psi (1,380 kPa)
Typical Operating Flux	10-20GFD (15-35LMH)
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): 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
Feedwater³	NTU < 1 SDI < 5

³SDI 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.

Figure 1a: Element Dimensions Diagram – Male

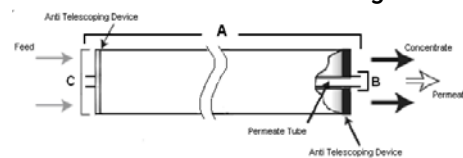
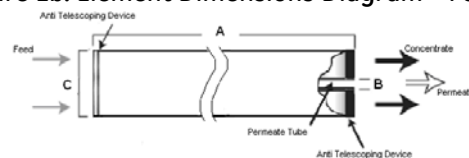


Figure 1b: Element Dimensions Diagram – Female



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Table 3: Dimensions and Weights

Model ¹	Type	Dimensions, inches (cm)			Boxed Weight lbs (kg)
		A	B ²	C	
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)
AG-1600	Female	40.0 (101.6)	3.000 (7.620)	16.0 (40.6)	120 (54)

AK HR Series

High Rejection Low Energy Brackish Water RO Elements

The A-Series proprietary thin-film reverse osmosis membrane elements are characterized by high flux and high sodium chloride rejection. AK HR low pressure brackish elements are selected when high rejection and low operating pressures are desired. These elements allow significant energy savings since good rejection is achieved at operating pressures as low as 100 psig (689 kPa).

These elements are recommended for low brackish water with salt concentration (TDS) levels up to 5,000mg/l. In turn, AK HR elements produce a permeate quality close to a standard brackish membrane element at a much lower pressure.

Table 1: Element Specification

Membrane	Thin-film membrane (TFM*)		
Model	Average permeate flow gpd (m ³ /day) ^{1,2}	Average NaCl rejection ^{1,2}	Minimum NaCl rejection ^{1,2}
AK-90	2200 (8.3)	99.5%	99.0%
AK-365	9600 (36.3)	99.5%	99.0%
AK-400	10500 (39.7)	99.5%	99.0%
AK-440	11500 (43.5)	99.5%	99.0%
AK-1600	42000 (159.0)	99.5%	99.0%

¹Average salt rejection after 24 hours operation. Individual flow rate may vary +25%/-15%.

²Testing conditions: 500ppm NaCl solution at 115psi (862kPa) operating pressure, 77°F (25°C), pH7.5 and 15% recovery.

Model	Active area ft ² (m ²)	Outer wrap	Part number
AK-90	90 (8.4)	Fiberglass	3056678
AK-365	365 (33.9)	Fiberglass	3056679
AK-400	400 (37.2)	Fiberglass	3056680
AK-440	440 (40.9)	Fiberglass	3056681
AK-1600	1600 (148.6)	Fiberglass	3056682

Table 2: Operating and CIP parameters

Typical Operating Pressure	120 psi (830 kPa)
Typical Operating Flux	10-20GFD (15-35LMH)
Maximum Operating Pressure	400 psi (2,758 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
Feedwater³	NTU < 1 SDI < 5

³SDI 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.

Figure 1a: Element Dimensions Diagram – Male

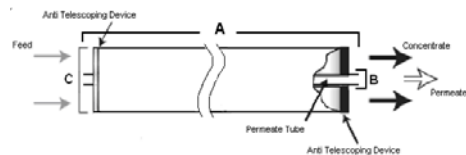
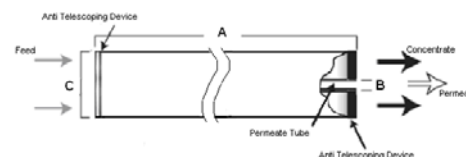


Figure 1b: Element Dimensions Diagram – Female



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Table 3: Dimensions and Weights

Model ¹	Type	Dimensions, inches (cm)			Boxed
		A	B ²	C	Weight lbs (kg)
AK-90	Male	40.0 (101.6)	0.75 (1.90)	3.9 (9.9)	9 (4)
AK-365	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)
AK-400	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)
AK-440	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)
AK-1600	Female	40.0 (101.6)	3.000 (7.620)	16.0 (40.6)	120 (54)

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 800psi (5,516kPa)).

Table 1: Element Specification

Membrane	Thin-film membrane (TFM*)
----------	---------------------------

¹ Average salt rejection after 24 hours operation. Individual flow rate may vary +25%/-15%.

² Testing conditions: 32,000mg/l NaCl solution at 800psi (5,516kPa) operating pressure, 77°F (25°C), pH7.5 and 10% recovery.

Model	Average permeate flow gpd (m3/day) ^{1,2}	Average NaCl rejection ^{1,2}	Minimum NaCl rejection ^{1,2}
AE-90	2000 (7.6)	99.8%	99.3%
AE-400	9000 (34.1)	99.8%	99.3%
AE-400, 34	9000 (34.1)	99.8%	99.3%
AE-440	9900 (37.5)	99.8%	99.3%
AE-1600	36000 (136.3)	99.8%	99.3%

Model	Active area ft ² (m ²)	Outer wrap	Part number
AE-90	90 (8.4)	Fiberglass	3056660
AE-400	400 (37.2)	Fiberglass	3056661
AE-400, 34	400 (37.2)	Fiberglass	3056662
AE-440	440 (40.9)	Fiberglass	3056663
AE-1600	1600 (148.6)	Fiberglass	3056664

Table 2: Operating and CIP parameters

Typical Operating Pressure	800psi (5,516kPa)
Typical Operating Flux	7-11GFD (12-19LMH)
Maximum Operating Pressure	1,200psi (8,274kPa)
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
Feedwater³	NTU < 1 SDI < 5

³SDI 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.

Figure 1a: Element Dimensions Diagram – Male

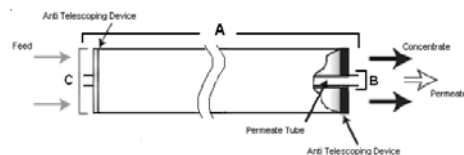
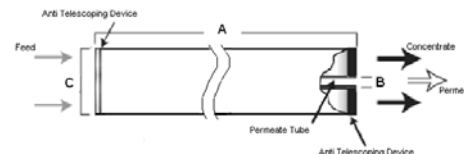


Figure 1b: Element Dimensions Diagram – Female



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Table 3: Dimensions and Weights

Model ¹	Type	Dimensions, inches (cm)			Boxed Weight lbs (kg)
		A	B ²	C	
AE-90	Male	40.0 (101.6)	0.75 (1.90)	3.9 (9.9)	9 (4)
AE-400	Female	40.0 (101.6)	1.125 (2.86)	7.9 (20.1)	35 (16)
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)
AE-1600	Female	40.0 (101.6)	3.000 (7.620)	16.0 (40.6)	120 (54)