

Input Data Summary

Project Information

Project Name: Planta de agua Potable Familia Manera
 Puerto
 Madryn
 Argentina

Flowsheet Configuration

Flowsheet Type	Single Pass Flowsheet	Feed Dosing	No
AfterFeed Dosing	No	Product Dosing 1	No
Product Dosing 2	No	Feed Stripping	No
Product Stripping	No	Raw Feed Bypass	No
RO1 to RO1 Recycle	No	Turbo Charger	No

Feed Information

Temperature, °C	20	RO-1:	
Feed pH	8.1	Silt Density Index:	3

Feed Stream Composition(mg/L): Source - Sea Wellwater

Calcium (Ca)	468.00		Sulfate (SO4)	2754.00
Magnesium (Mg)	1448.00		Chloride (Cl)	21944.01
Sodium (Na)	11943.26		Fluoride (F)	1.49
Potassium (K)	605.00		Nitrate (NO3)	7.39
Ammonia - N (NH4)	0.40		Bromide (Br)	55.70
Barium (Ba)	1.00		Phosphate (PO4)	0.90
Strontium (Sr)	0.00		Boron (B)	0.00
Iron (Fe)	0.04		Silica (SiO2)	7.32
Manganese (Mn)	0.04		Hydrogen Sulfide (H2S)	0.00
			Bicarbonate (HCO3)	17.84
			Carbon Dioxide (CO2)	0.09
			Carbonate (CO3)	0.35

Flow Rate Specifications

Product Flow:		4.00 m3/hr
Recovery %	RO1	35

First Pass Array Data

Stage	Housing	Element	Element Type	Element Age (yr)	Pre-stage Pressure Change bar		Permeate Pressure bar	Annual Change %	
					Boost	Drop		A-Value	B-Value
1	2	4	AD-400,34	3	0,00	0,00	0,00	4	5

Results Summary

Flow Data		m3/hr	Analytical Data		mg/L
Raw Feed		11.43	Raw Feed TDS		39254.74
Product		4.00	Product TDS		181.46
Concentrate		7.43	Concentrate TDS		60276.28

System Data		Single Pass Design	
Temperature: °C	RO-1:	20	System Rec. 35%

Average Flux (gfd), Pass and Stage

Pass	Average	Stage 1
Pass 1	7.93	7.93

Array Data					Pass 1
Recovery %:	35.0	Conc. TDS mg/L:	60276.28	Conc. Flow m3/hr:	7.43

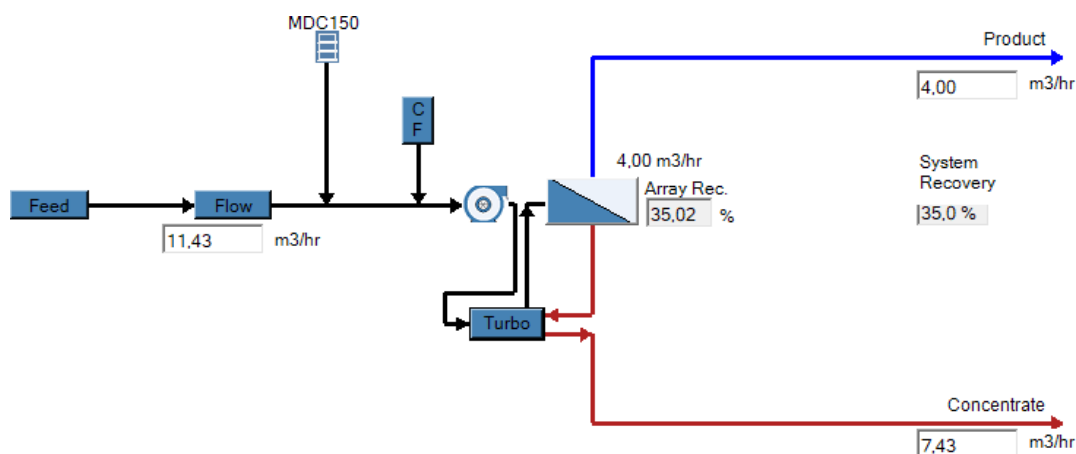
Stage	Total		Element Type	Flow m3/hr		Pressure bar		Perm TDS
	Housing	Element		Feed	Perm	Feed	DP	mg/L
1	2	8	AD-400,34	11.43	4.00	56.94	0.22	181.46
Total	2	8						

Analytical Data								
Cation	mg/L			Anion	mg/L			
	Product	Feed	Conc		Product	Feed	Conc	
Ca	0.55	468.00	719.49	SO4	1.90	2754.00	4234.64	
Mg	1.36	1448.00	2226.30	Cl	107.36	21944.01	33692.19	
Na	64.85	11943.26	18333.88	F	0.02	1.49	2.28	
K	4.62	605.00	928.01	NO3	0.08	7.39	11.32	
NH4	0.02	0.40	0.60	Br	0.42	55.70	85.44	
Ba	0.00	1.00	1.54	PO4	0.00	0.90	1.38	
Sr	0.00	0.00	0.00	B	0.00	0.00	0.00	
Fe	0.00	0.04	0.06	SiO2	0.04	7.32	11.24	
Mn	0.00	0.04	0.06	H2S	0.00	0.00	0.00	
TDS mg/L	181.46	39254.74	60276.28	HCO3	0.24	17.84	27.22	
pH	6.78	8.10	8.08	CO2	0.06	0.09	0.11	
				CO3	0.00	0.35	0.61	
Saturation Data								
BaSO4 %	0.34	3718.11	6040.76	CaF2 %	0.00	24.36	73.48	
CaSO4 %	0.00	23.60	40.05	SiO2 %	0.03	5.74	8.82	
SrSO4 %	0.00	0.00	0.00	LSI	-5.54	-0.23	0.07	
Struvite %	0.00	0.01	0.01	Pi bar	0.14	28.15	44.25	

Design Notes, Errors and Warnings

Disclaimer: This projection is provided as a service and does not constitute a performance warranty.

Process Data Sheet



Flow Data	m3/hr	Analytical Data	mg/L
Raw Feed	11.43	Raw Feed TDS	39254.74
Product	4.00	Product TDS	181.46
Concentrate	7.43	Concentrate TDS	60276.28

System Data	Single Pass Design		
Temperature: °C	RO-1:	20	

		Pass 1	Pass 2	Pass 3
Feed Flow to 1st Stage Housing	m3/hr	11.43		
Feed Pressure	bar	56.94		
Array Recovery	%	35.0		
Permeate Flow	m3/hr	4.00		
Split Permeate Flow	m3/hr	0.00		

Pump Summary				
Main Pump	Feed Flow	m3/hr	11.43	
	Inlet Pressure	bar	0.00	
	Discharge Pressure	bar	39.16	
	Total Efficiency	%	82.88	
	Power	kW	15.00	

Total Power Consumption	kW	15.00
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Chemical Additions					
Addition (chemical as 100 %)		Kg/Day	mg/L in feed		
Antiscalant in Feed *	EISI RO10	1.38	5.04	Al in conc.(mg/L)	0.10

Streams Analytical Data

Parameter	Unit	Raw Feed	RO1 Element Feed	Final RO Permeate	Product
Calcium	mg/L	468.00	468.00	0.55	0.55
Magnesium	mg/L	1448.00	1448.00	1.36	1.36
Sodium	mg/L	11943.26	11943.26	64.85	64.85
Potassium	mg/L	605.00	605.00	4.62	4.62
Ammonia - N (NH4)	mg/L	0.40	0.40	0.02	0.02
Barium	mg/L	1.00	1.00	0.00	0.00
Strontium	mg/L	0.00	0.00	0.00	0.00
Iron	mg/L	0.04	0.04	0.00	0.00
Manganese	mg/L	0.04	0.04	0.00	0.00
Sulfate	mg/L	2754.00	2754.00	1.90	1.90
Chloride	mg/L	21944.01	21944.01	107.36	107.36
Fluoride	mg/L	1.49	1.49	0.02	0.02
Nitrate	mg/L	7.39	7.39	0.08	0.08
Bromide	mg/L	55.70	55.70	0.42	0.42
Phosphate	mg/L	0.90	0.90	0.00	0.00
Boron	mg/L	0.00	0.00	0.00	0.00
Silica	mg/L	7.32	7.32	0.04	0.04
Hydrogen Sulfide	mg/L	0.00	0.00	0.00	0.00
Bicarbonate	mg/L	17.84	17.84	0.24	0.24
Carbon Dioxide	mg/L	0.09	0.09	0.06	0.06
Carbonate	mg/L	0.35	0.35	0.00	0.00
TDS	mg/L	39254.74	39254.74	181.46	181.46
Flow	m3/hr	11.43	11.43	4.00	4.00
Temperature	°C	20.00	20.00	20.00	20.00
Pressure	bar	0.00	56.94	0.00	0.00
Hardness	ppmasCaCO ₃	7131.54	7131.54	6.97	6.97
Density	kg/m3	1025.64	1025.64	998.29	998.29
Ionic Strength		0.79	0.79	0.00	0.00
Osm. Pressure	bar	28.15	28.15	0.14	0.14
pH		8.10	8.10	6.78	6.78
Conductivity at 25°C	µS/cm	57399.00	57399.00	378.00	378.00
BaSO4	%	3718.11	3718.11	0.34	0.34
CaF2	%	24.36	24.36	0.00	0.00
CaSO4	%	23.60	23.60	0.00	0.00
SiO2	%	5.74	5.74	0.03	0.03
SrSO4	%	0.00	0.00	0.00	0.00
Struvite	%	0.01	0.01	0.00	0.00
LSI		-0.23	-0.23	-5.54	-5.54
S&DI		-0.70	-0.70	-5.97	-5.97

Parameter	Unit	RO1 Concentrate
Calcium	mg/L	719.49
Magnesium	mg/L	2226.30
Sodium	mg/L	18333.88
Potassium	mg/L	928.01
Ammonia - N (NH4)	mg/L	0.60
Barium	mg/L	1.54
Strontium	mg/L	0.00
Iron	mg/L	0.06
Manganese	mg/L	0.06
Sulfate	mg/L	4234.64
Chloride	mg/L	33692.19
Fluoride	mg/L	2.28
Nitrate	mg/L	11.32
Bromide	mg/L	85.44
Phosphate	mg/L	1.38
Boron	mg/L	0.00
Silica	mg/L	11.24
Hydrogen Sulfide	mg/L	0.00
Bicarbonate	mg/L	27.22
Carbon Dioxide	mg/L	0.11
Carbonate	mg/L	0.61
TDS	mg/L	60276.28
Flow	m3/hr	7.43
Temperature	°C	20.00
Pressure	bar	56.72
Hardness	ppmasCaC O3	10964.61
Density	kg/m3	1039.78
Ionic Strength		1.22
Osm. Pressure	bar	44.25
pH		8.08
Conductivity at 25°C	µS/cm	82819.00
BaSO4	%	6040.76
CaF2	%	73.48
CaSO4	%	40.05
SiO2	%	8.82
SrSO4	%	0.00
Struvite	%	0.01
LSI		0.07
S&DI		-0.48

Element detail Data

Element By Element Data

Pass 1 Stage 1	Elem 1	Elem 2	Elem 3	Elem 4
Feed	5.71	5.04	4.49	4.05
Perm	0.67	0.55	0.44	0.34
Feed	56.94	56.87	56.82	56.76
Net Driving	23.65	19.57	15.56	11.88
Delta P	0.07	0.06	0.05	0.04
Feed Osm. Press	28.15	32.05	36.19	40.35
Recovery, %	11.87	11.13	9.96	8.45
Beta (Conc. Pol.)	1.11	1.10	1.09	1.07
Flux, gfd	10.61	8.78	6.99	5.34
A-Value, $\mu\text{m}/(\text{s-MPa})$	2.11	2.11	2.12	2.12
Calcium	0.34	0.47	0.65	0.94
Magnesium	0.86	1.17	1.63	2.32
Sodium	40.06	55.29	78.10	112.66
Potassium	2.85	3.93	5.56	8.03
Ammonia - N (NH4)	0.02	0.02	0.02	0.03
Barium	0.00	0.00	0.00	0.00
Strontium	0.00	0.00	0.00	0.00
Iron	0.00	0.00	0.00	0.00
Manganese	0.00	0.00	0.00	0.00
Sulfate	1.22	1.65	2.27	3.21
Chloride	66.35	91.55	129.28	186.45
Fluoride	0.01	0.01	0.02	0.03
Nitrate	0.05	0.07	0.10	0.14
Bromide	0.26	0.36	0.51	0.73
Phosphate	0.00	0.00	0.00	0.00
Boron	0.00	0.00	0.00	0.00
Silica	0.03	0.04	0.05	0.07
Hydrogen Sulfide	0.00	0.00	0.00	0.00
Bicarbonate	0.17	0.21	0.28	0.38
Carbon Dioxide	0.06	0.06	0.07	0.07
Carbonate	0.00	0.00	0.00	0.00
TDS, mg/L	112.21	154.76	218.48	314.98
pH	6.68	6.74	6.83	6.92
Conductivity at 25°C, $\mu\text{S}/\text{cm}$	236.00	323.00	453.00	648.00
Hardness, ppm as CaCO3	4.40	5.99	8.34	11.88
Density, kg/m3	998.24	998.27	998.31	998.38
Ionic Strength	0.00	0.00	0.00	0.01
BaSO4, %	0.21	0.29	0.42	0.62
CaF2, %	0.00	0.00	0.00	0.00
CaSO4, %	0.00	0.00	0.00	0.00
SiO2, %	0.02	0.03	0.04	0.06
SrSO4, %	0.00	0.00	0.00	0.00
Struvite, %	0.00	0.00	0.00	0.00
LSI	-5.98	-5.69	-5.37	-5.01
S&DI	-6.43	-6.13	-5.79	-5.40

Turbo Charger

Input/System Parameters(1st Pass)

Parameter		Value
Low P Discharge Pressure	bar	2.03
Cost of Power	\$/kWh	0.10
Net Transfer Efficiency	%	50.00

Calculated/Output Parameters(1st Pass)

Parameter		Value
Energy Recovered	kW	5.64
Boost Pressure	bar	17.78
Turbo Inlet Pressure	bar	39.16
Turbo Outlet Pressure	bar	56.94