Calculation of Pure Water Permeability (PWP)
Used to check the current state of cleanliness of the membrane

Also see these documents:
- Annex 1 – Example of a PWP calculation
- Annex 2 – Example of Osmosis record
- Annex 3 – Correction Factors

1- **When buying a new membrane, start the osmosis system, take the rate of flow (L/min or gal/min) and list it in Column C of the Osmosis Record.**

   [For a used membrane, soap can be used at the beginning of the season before calculation].

   [If the flowmeter doesn't work, note the time required for a certain quantity of water to pass through the membrane. List the volume (L) and the time (minute) in Columns A and B. To obtain the flow rate, divide the volume by the time (A ÷ B = L/min) and list in Column C.]

2- **Measure the temperature of filtrate and list in Column D.**

3- **With the table (see Annex 3), find the correction factor corresponding to the temperature of filtrate.**

   [The temperature of the filtrate can vary its speed, so a correction factor is used to obtain comparable results.]

4- **Multiply the debit of filtrate by the correction factor and list the result in Column F (C x E = PWP L/min).**

   [The first PWP result is our 100 %. This result is used to determine the loss of efficiency of the membrane during the season.]

5- **To calculate the efficiency of membrane during the season, divide the PWP result calculated during the season by our first 100% PWP result. Then, multiply this result by 100 to obtain a percentage.**

   Soap can be used when efficiency is lower than 85%.

   Note: Other similar tables exist. For some, the filtrate flow is divided (not multiplied) by the correction factor. In such cases, Table in Annex 3 is not representative. You must use another table of correction factors.

Annex 1

Example of Pure Water Permeability (PWP) Calculation
(See the record completed in Annex 2)

At the beginning of season:

Debit of 40 L/min for a filtrate at 10° C. The correction factor for this temperature is 1.088 (Annexe 3).

Calculation of PWP: 40 x 1.088 = 43.52 L/min

During the season:

Debit of 30 L/min for a filtrate at 7° C. The correction factor is 1.188.

Calculation of PWP: 30 x 1.188 = 35.64 L/min
Efficiency: 35.64 ÷ 43.52 x 100 = 81.89%
(The result is lower than 85 %, a soap can be used)

Annex 2

Osmosis Record (Example)

Date	Activity (Cleaning, rinse…)	Number of hours of operation		A Volume used to fill (liters)	B Time required to fill Volume A (min) (sec)	C Filtrate flow (L/min) A / B (l/min) A/B * 60	D T° at the outlet of filtrate (°C or F)	E Correction Factor (See Table)	F PWP C x E	G Efficiency of the membrane Actual PWP ÷ 100 % PWP	Product used	Qty of water used for rinsing	Person in charge
		Hrs	Cum. hrs										
March 23	Cleaning	5				40 l/min	10 C	1,088	43,52	100%	Biomembrane	600gal	i.b.
xxx	Rinsing	5	10			xx	xxx	xxx	xxx	xxx			
April 7	Cleaning	5	15			30 l/min	7 C	1,188	35,64	81,89% (35,64/43,52 * 100)	Biomembrane	600gal	i.b.

Annex 3

Correction Factors for all types of membrane*

T° of filtrate Celsius	T° of filtrate Fahrenheit	Correction Factor
0	32	1,488
1	34	1,439
2	36	1,391
3	37	1,348
4	39	1,305
5	41	1,266
6	43	1,226
7	45	1,188
8	46	1,155
9	48	1,120
10	50	1,088
11	52	1,057
12	54	1,028
13	55	1,000
14	57	0,973
15	59	0,948
16	61	0,923
17	63	0,899
18	64	0,876
19	66	0,855
20	68	0,833
21	70	0,814
22	72	0,794
23	73	0,776
24	75	0,758
25	77	0,741

*Debit of filtrate multiplied by Correction Factor.