FOULING INDEX	EXP 45

The fouling index is a physical measurement used to determine the content of colloids in water (between 0.9 and 0.5 µm) ; the measurement is taken by determining the degree of fouling on a surface with a porosity of 0.45 µm.

It is very important to determine and monitor this index right along the reverse osmosis chain. This test has to be carried out downstream of the microfiltration system on the water feeding the osmosis unit. It is essential to run this test systematically after each replacement of the microfiltration cartridge to check its total integrity. It is also necessary to run this check regularly to monitor the variations of the feed water quality and the condition of the microfiltration cartridges.

Principle

The fouling of a cellulose acetate membrane with a porosity of 0.45 µm is determined once the water in question has been filtered for 15 minutes.

Permo can supply the equipment needed for measuring the fouling index.

The Permo fouling test case is available under code P0005050.
The wallet of 100 membranes for the fouling test code P0005150.

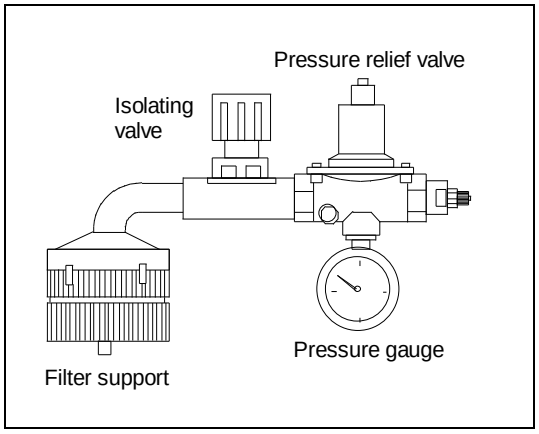
Composition of the Permo case:

A measurement system mounted on a support panel and including:

- a pressure relief valve adjusted by means of an Allen wrench and a 0-4 bar pressure gauge,
- an isolating valve,
- a filter support 47 mm in diameter containing two removable perforated panels.

The various accessories needed for measurement:

- a bag of membranes (white disks separated by a colored disk) with 0.45 µm porosity,
- a 500 ml graduated flask,
- a stopwatch,
- a pair of tweezers for handling the membranes.



- *Diagram of a fouling index measuring device* -

Procedure with the *Permo* case

Place the measurement plate in such a way that the membrane is in the horizontal plane. Connect the pipe supplying the water to be analyzed to the ribbed coupling. Open the valve and unscrew the filter holder to thoroughly purge the circuit ; close.

Take a membrane (white disk) with the tweezers and place it on the support (between the striated faces of the two perforated plates), wet it and fit the O-ring, then close the filter-holder, taking care not to tear the membrane. The measurement can now be made.

STEP No. 1

Open the valve, unscrew the pressure relief valve lug and **adjust** the pressure (using an Allen wrench) to 2.1 bar (pressure gauge). Immediately afterward, place the flask under the filter-holder and use a stopwatch to measure time t_0 (in seconds) as needed to filter 500 ml of water. This time must be greater than 10 seconds and less than 3 minutes; **restart** if the pressure varies by ± 5% during measurement. Make a note of time t_0 and remove the flask.

STEP No. 2

Leave the filter in place and allow to operate for 15 minutes while **regularly readjusting the pressure, if necessary, to 2.1 bar**.

STEP No. 3

After 15 minutes, repeat the same measurement as in **STEP** 1 **while preserving the same membrane**: Use the stopwatch to measure time t_{15} (in seconds) needed to filter 500 ml while checking the pressure (2.1 bar). Make a note of this time t_{15}.

Close the power supply and allow the circuit to drain slowly. Finally, close the valve to isolate the filter and remove the membrane, which may be preserved for complementary analyses.

Calculation

The fouling index FI_x is calculated on the basis of fouling capacity C % and time X in minutes between the two measurements t_o and t_x.

$$FI_X = \frac{C\,\%}{x} \qquad \text{avec} \qquad C\% = 100 * \left(1 - \frac{t_0}{t_x}\right)$$

If the percentage C % exceeds 80 % in 15 minutes, the same test must be started again for 10 min, 5 min or even 3 minutes (X = 10, 5 or 3).

***Example* : for X = 15 minutes**

t_o = 28 seconds
t_{15} = 44 seconds

$$C\,\% = 100\left(1 - \frac{28}{44}\right) = 36,4\,\% \qquad \text{et} \qquad FI_{15} = \frac{36,4\,\%}{15} = 2,4$$

The fouling index must never exceed 3. Otherwise, it is essential to get in touch with your Permo regional agency. Failure to comply with this instruction may lead to the cancellation of all guarantees covering the equipment.