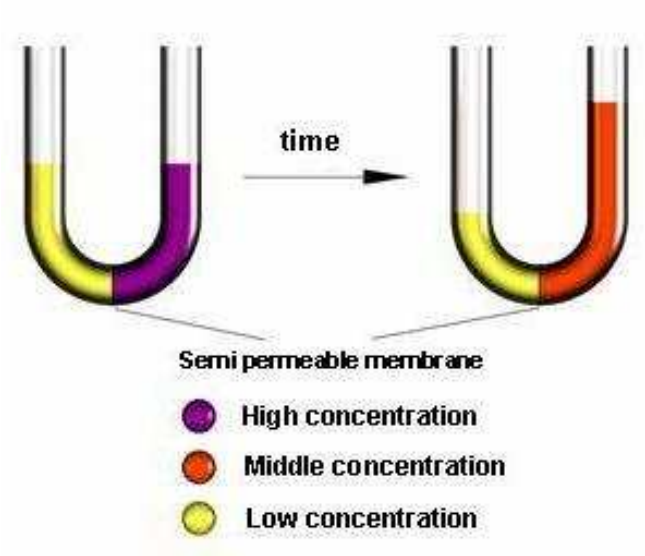
The osmotic effect

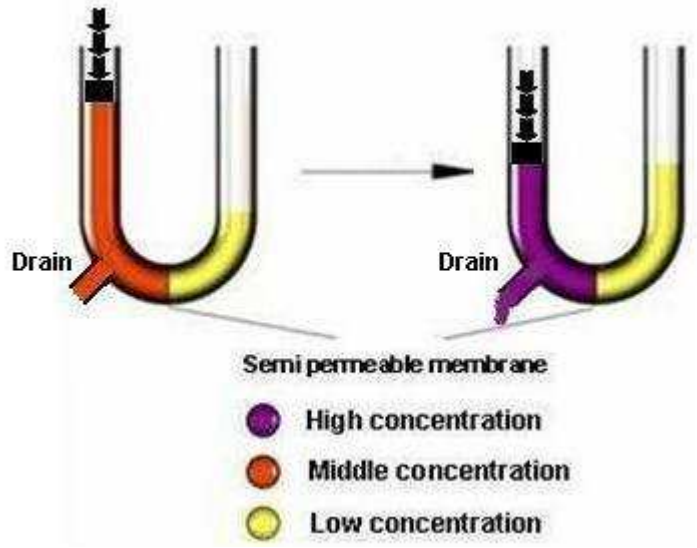
First time description of the osmotic effect was done by Jean-Antoine Nollet in 1748 and causes a natural process which can be observed with every living cell (e.g. water transport in plants).
If liquids of different concentrations are separated by a water permeable, but for solved and unsolved materials relaxed in the water impervious membrane (semi permeable membrane), the water from the solution of lower concentration will pass the membrane and dilute the concentrated solution.
This process only will end, if both solutions have the same concentration, or by the level difference and there by rising counterpressure an osmotic balance appears.



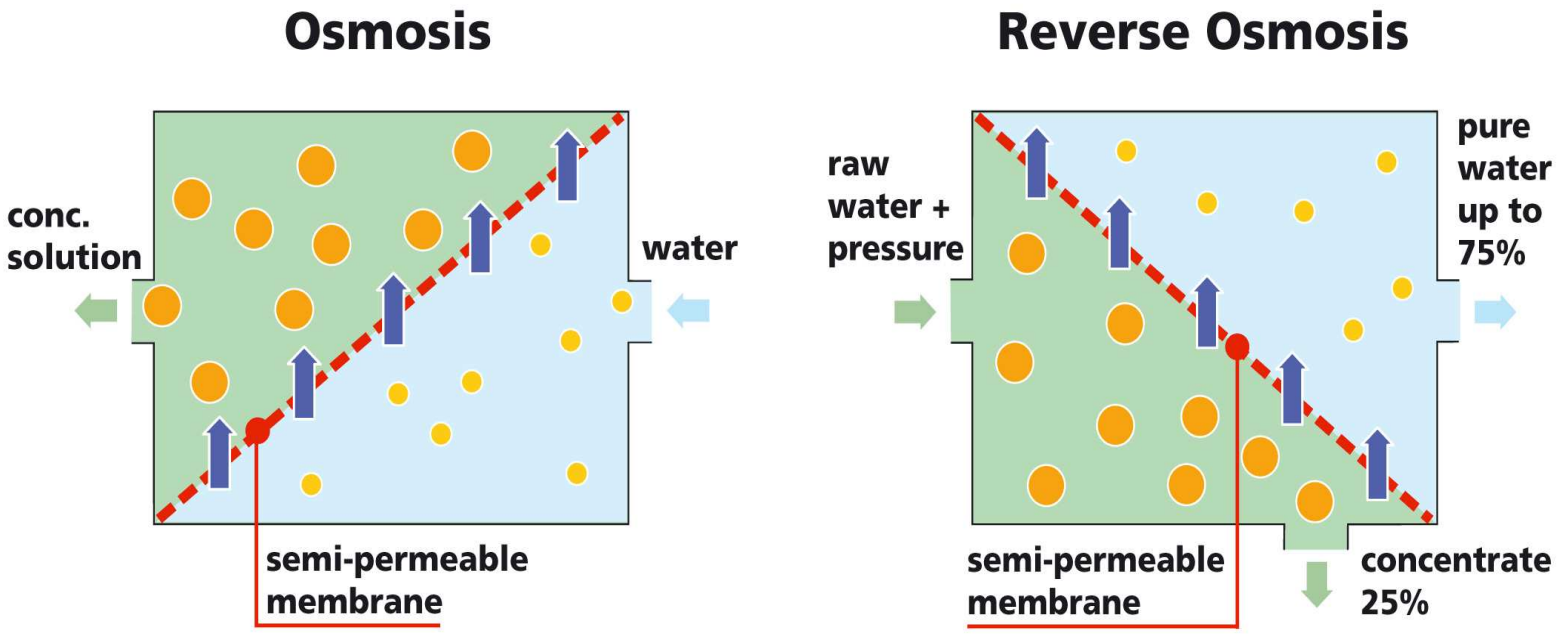
Revers Osmosis

If on a concentrated solution a higher pressure, than the osmotic pressure is given, the flow direction turns round. Water from the concentrated solution is pushed through the membrane and the concentration further rises.

This process is called “revers osmosis”.

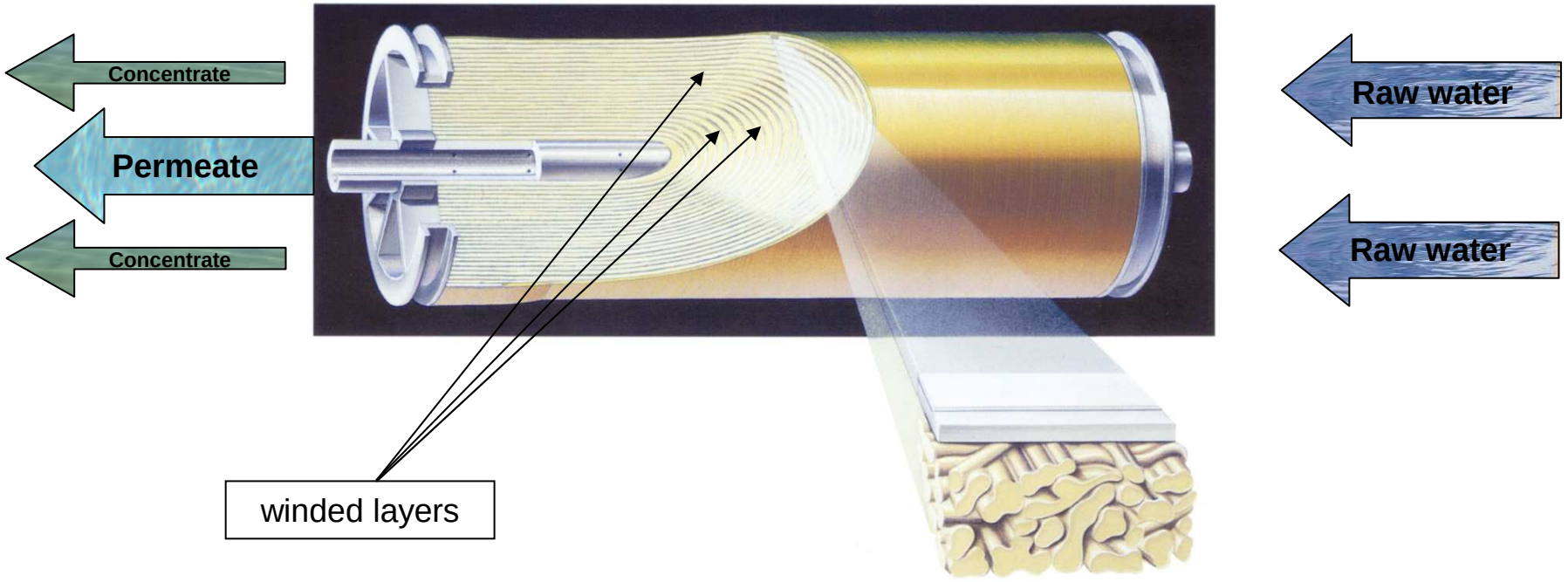


Reverse Osmosis Systems
How it works



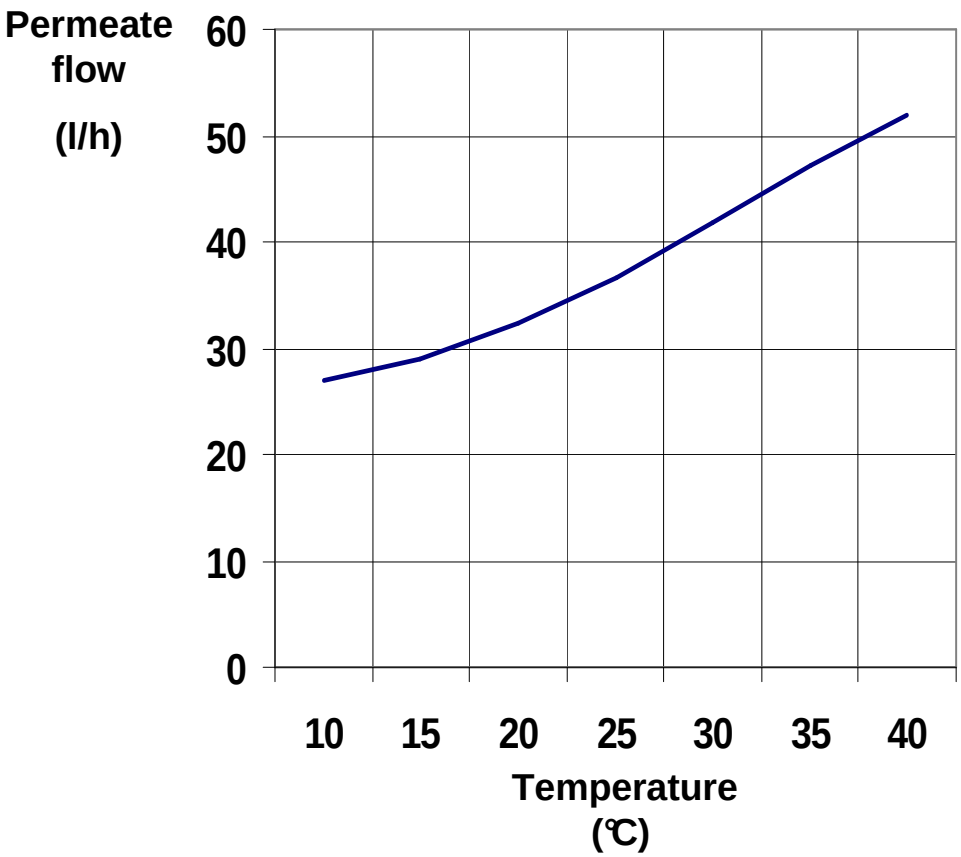
A reverse osmosis membrane reduces the salt content by approx. 97 –99%.
The conductivity of the water is correspondingly reduced.

Reverse Osmosis Membrane
Sectional View



	Flowrate	Salt content
Raw water:	100%	100%
Concentrate:	40 .. 33%	97 .. >99%
Permeate:	60 .. 66%	3 .. <1%

Reverse Osmosis
Performance and water temperature



The permeate performance of an RO-membrane depends on the feedwater temparature.

The rule of thumb:

1°C rising temperature =
3 % higher permeate flow

1°C temperature drop =
3 % lower permeate flow

When you compare the permeate performance of different RO systems you have to look at the Reference temperature.

Attention:
An increase of permeate flow because of a higher feed water temperature will result a higher permeate conductivity.