

Presentation

On

RO – 02 – Osmosis & RO

Prepared By

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[Ameera Consultancy] (<https://ameeraconsultancy.com/>)

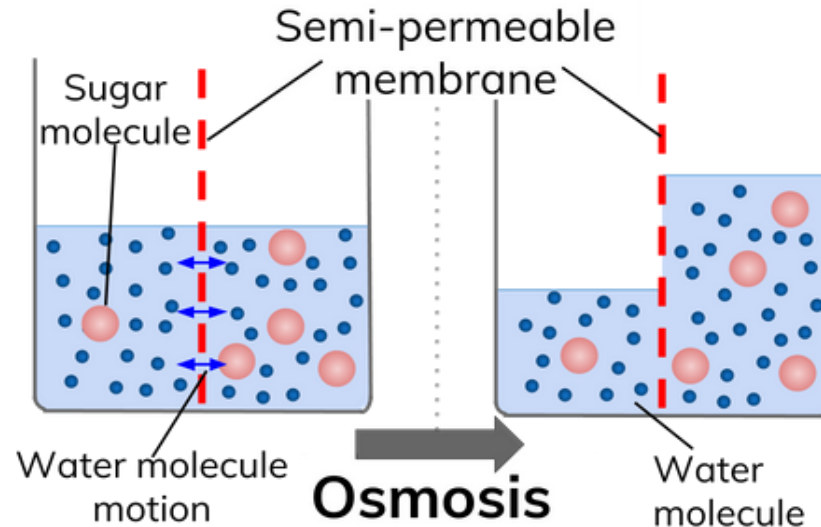
Osmosis - Introduction

Osmosis

Physical process by which a liquid starts to diffuse

Through a Semi-Permeable Membrane

When there is a difference in concentration of certain solute



A hydrostatic pressure is required for resisting the movement of solvent molecules [Osmotic Pressure]

Osmotic Pressure in an ideal solution is affected by temperature and volume.

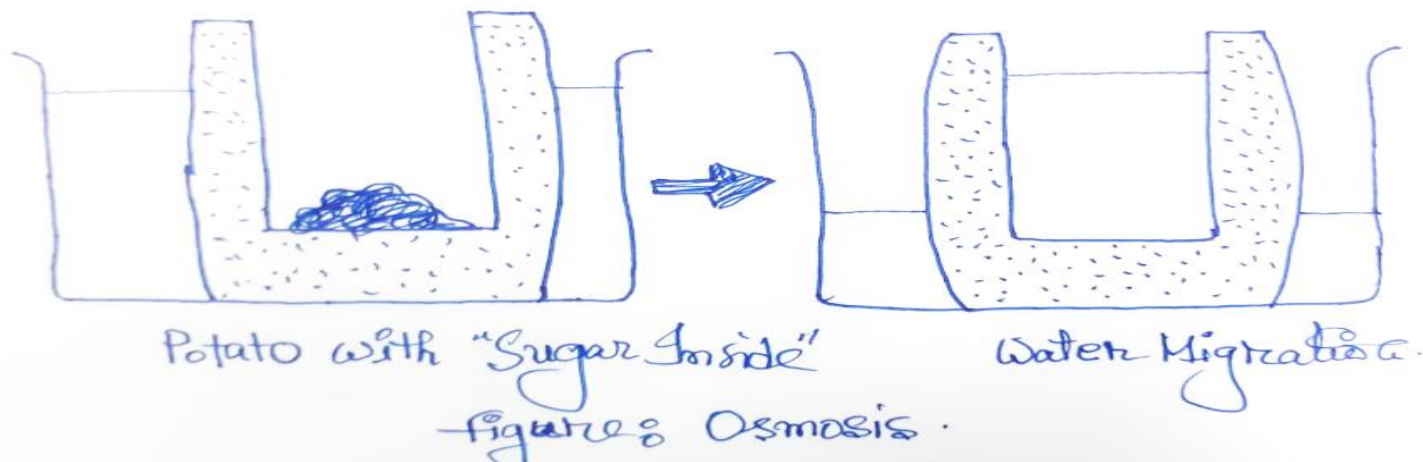
Osmosis – Semi Permeable Membrane

Semi Permeable Membrane

Allows Passing of some Selective Molecules & Atoms

All Items are not allowed to Pass through the membrane

Permeable for Water but not for the Solute.



A hydrostatic pressure is required for resisting the movement of solvent molecules [Osmotic Pressure]

Osmotic Pressure in an ideal solution is affected by temperature and volume.

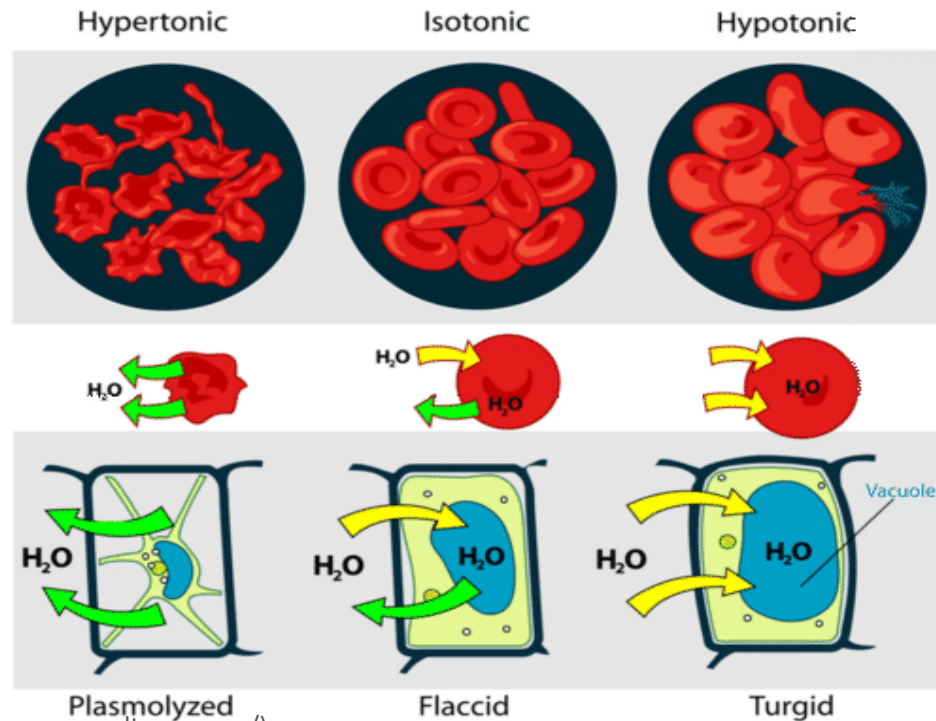
Osmosis – Types of Osmotic Condition

Types of Osmotic Condition

Hypertonic Condition a body cell will lose water from itself and finally gets squeezed

Isotonic Condition a body cell will be stable as water movement inside and outside is stable

Hypotonic Condition a body cell will gain water through osmosis & finally can blast



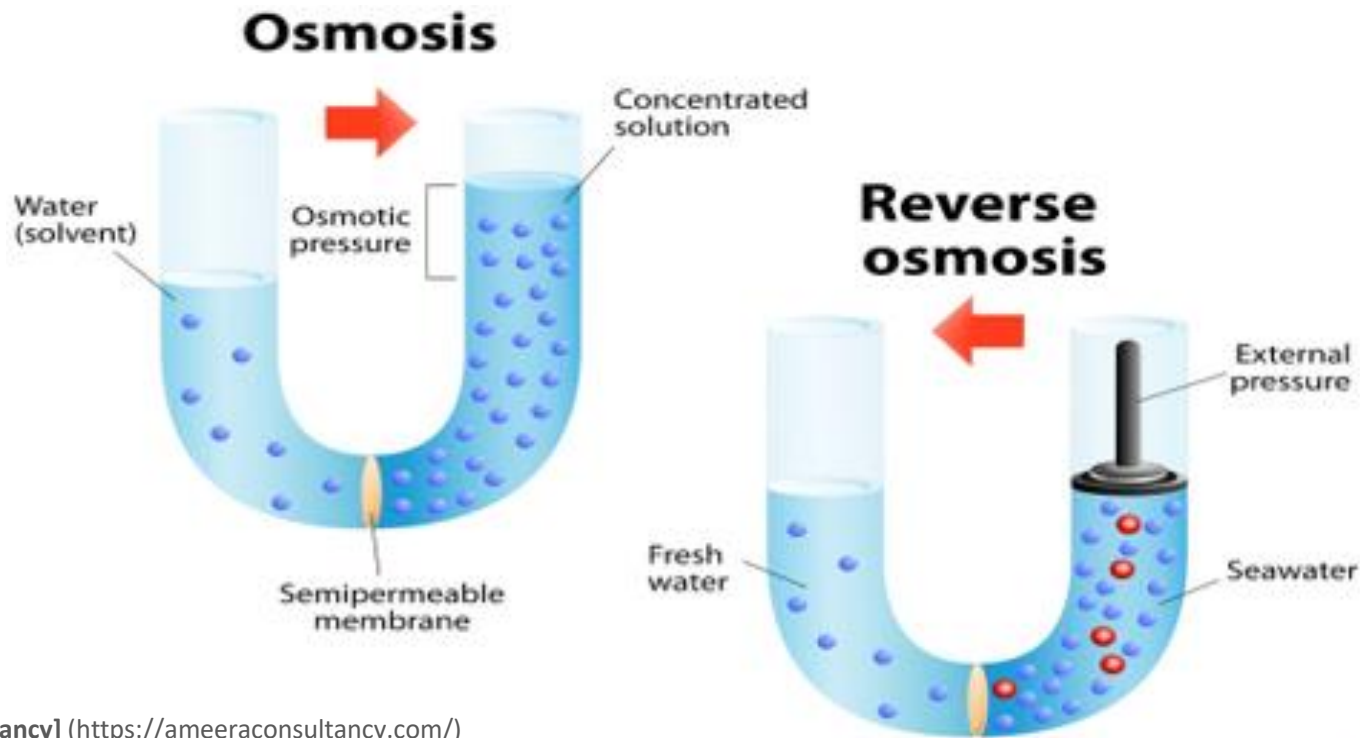
Reverse Osmosis - Introduction

Reverse Osmosis

Pressure applied to take water from Low conc. to its High conc.

Special type filtration with Porous/Semi-permeable membrane

Allows Pure Water to Pass [filter larger molecular impurities]



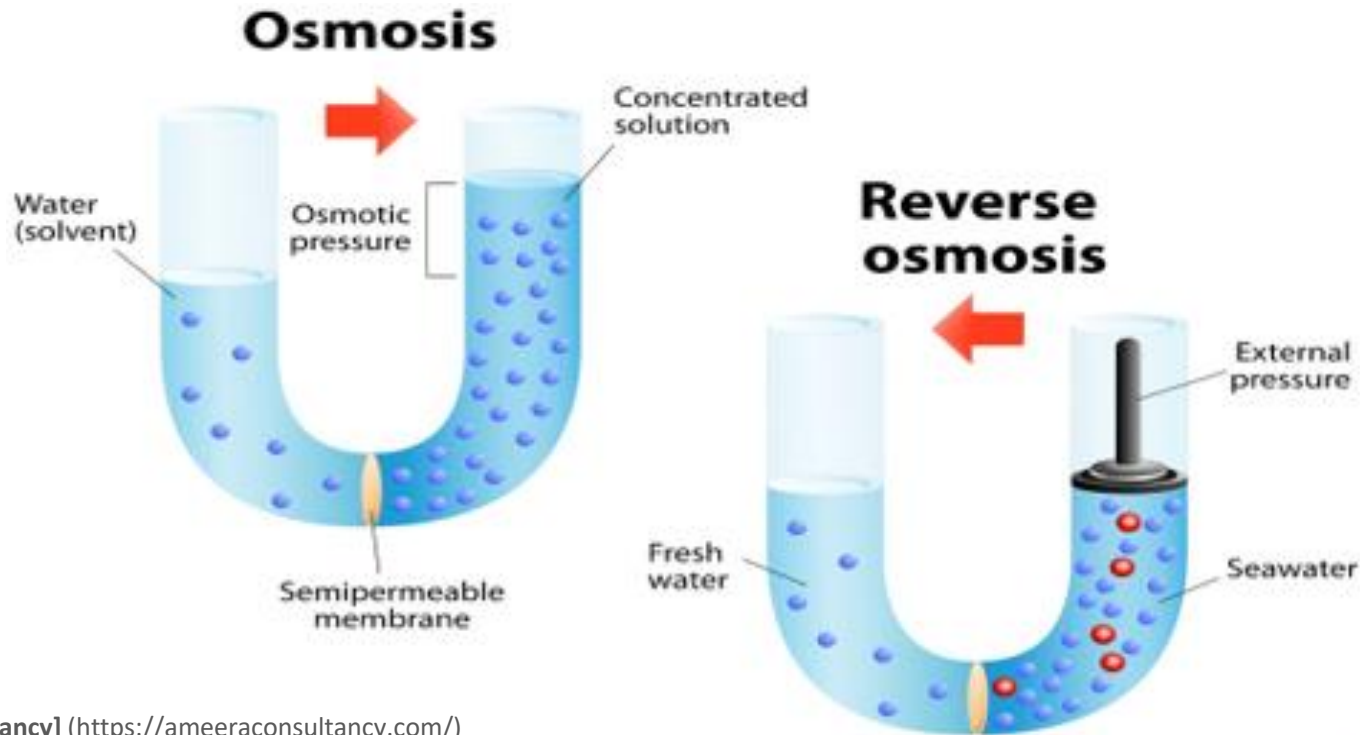
Reverse Osmosis - Introduction

Reverse Osmosis

Reversing Principle that functioning against Genuine Osmosis

Applied Pressure > Osmotic Pressure

RO used to get Very Low Hardened Water

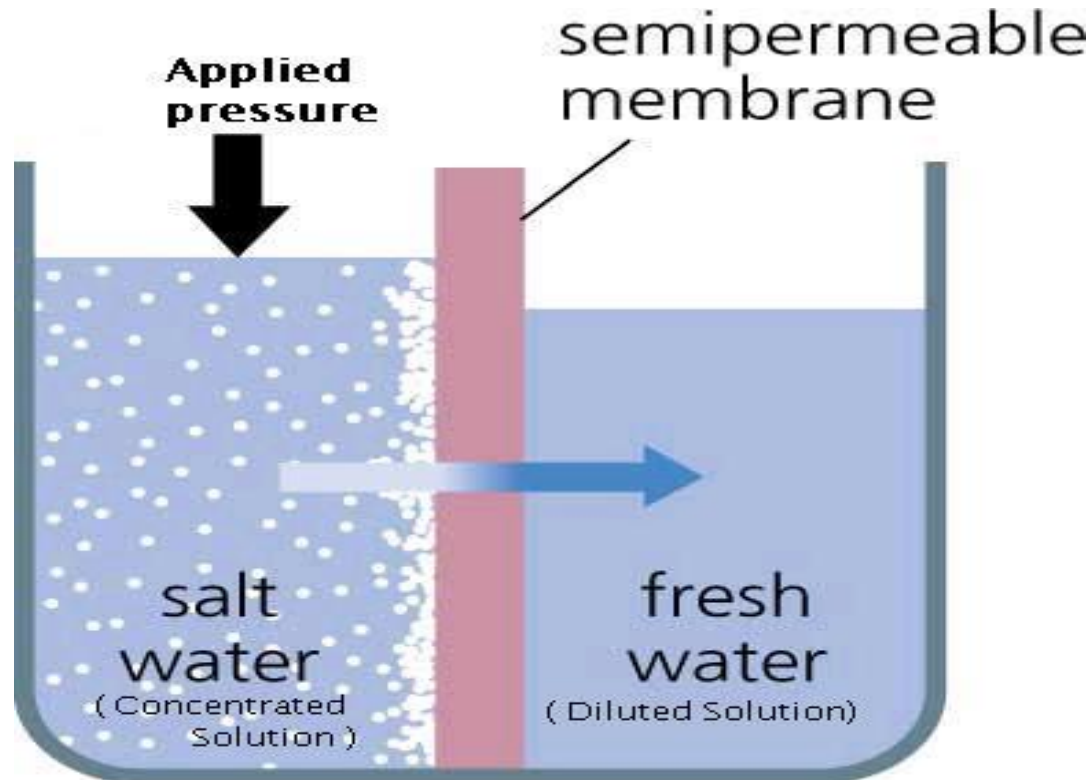


Reverse Osmosis - Introduction

Reverse Osmosis

Permeate Water: Demineralized or Deionized water

Reject/Concentrate Water: Concentrated Contaminants

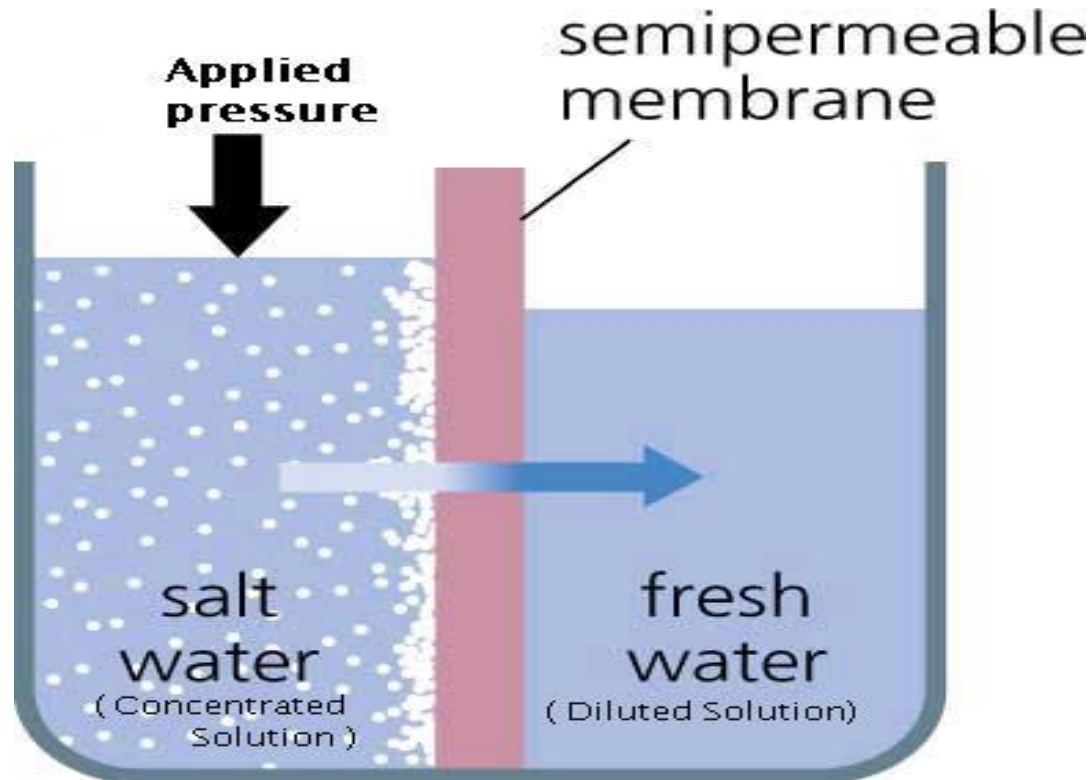


Reverse Osmosis Removes

Reverse Osmosis Removes

99% dissolved salt particles, colloids, micro-organisms etc.

RO cant remove gases [they are not highly charged] [CO₂]



Differences in between “Osmosis & RO”

Differences in between “Osmosis & Reverse Osmosis”

Osmosis

Natural Process

Works along the Potential Gradient

Works aligning with Osmotic Pressure

**Water Movement:
High Conc. ---→ Low Conc.**

Reverse Osmosis

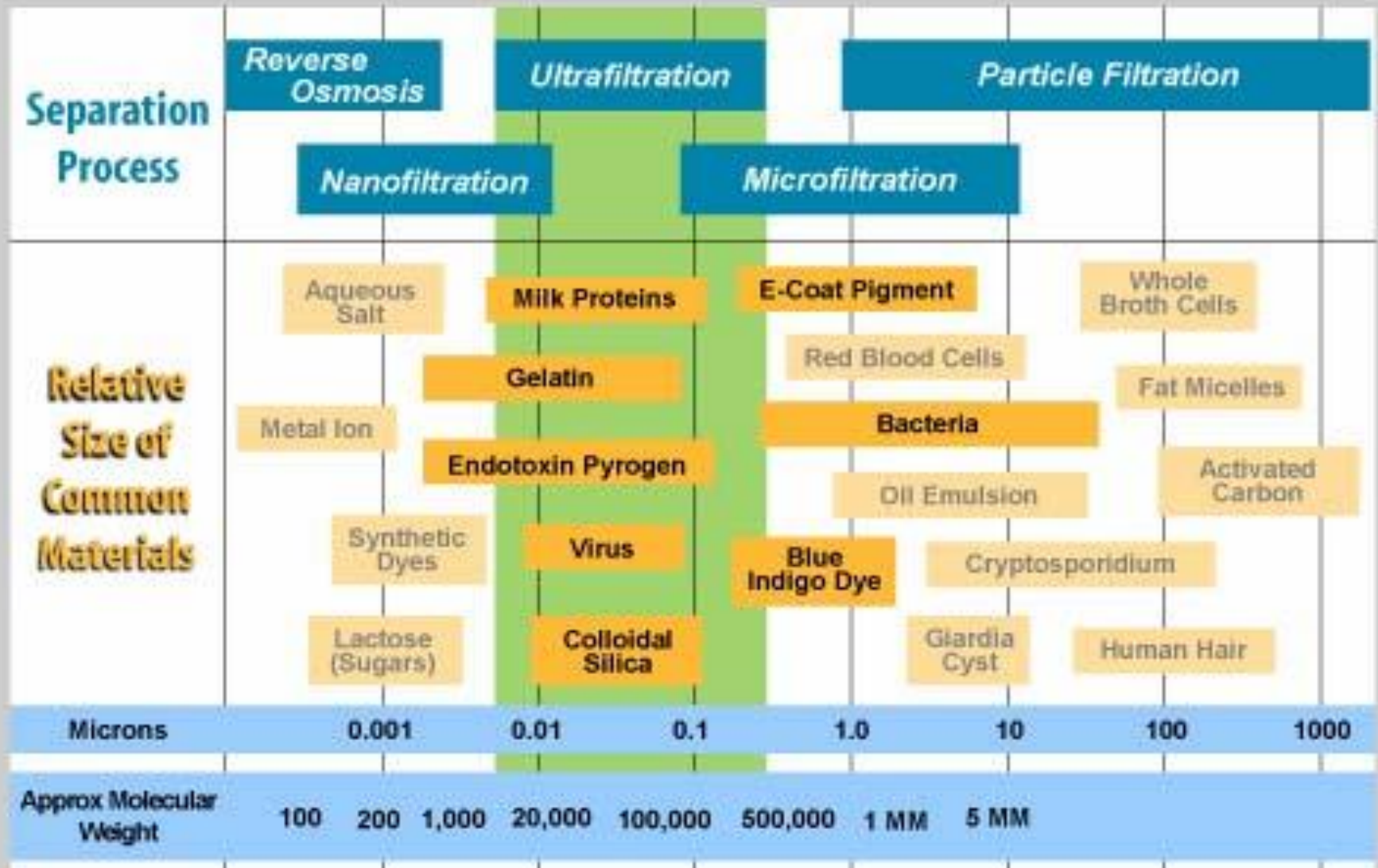
Artificial Pressurized Process

Works against the Potential Gradient

Works against the Osmotic Pressure

**Water Movement:
Low Conc. ---→ High Conc.**

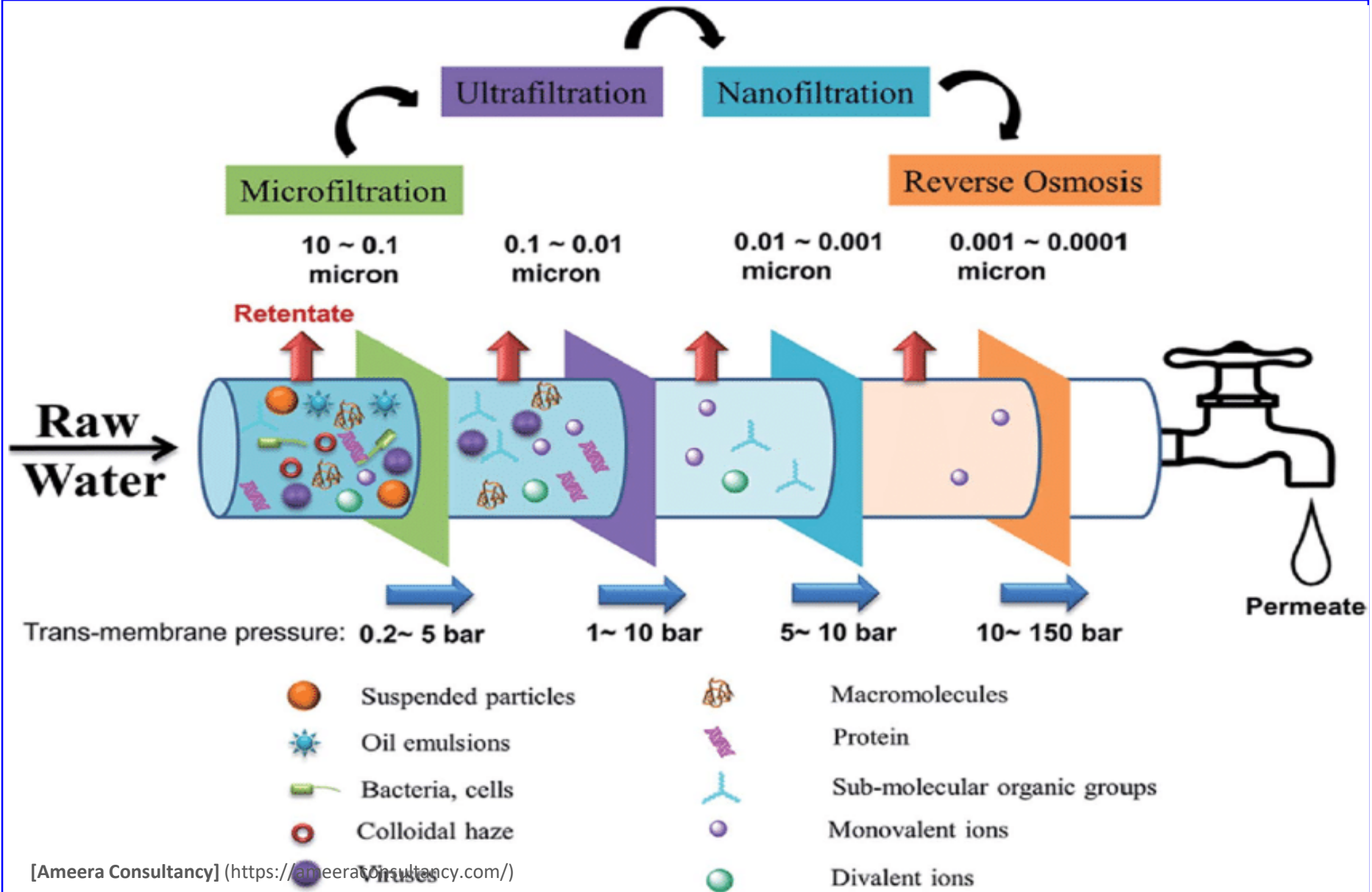
Solids & Suspensions Removal



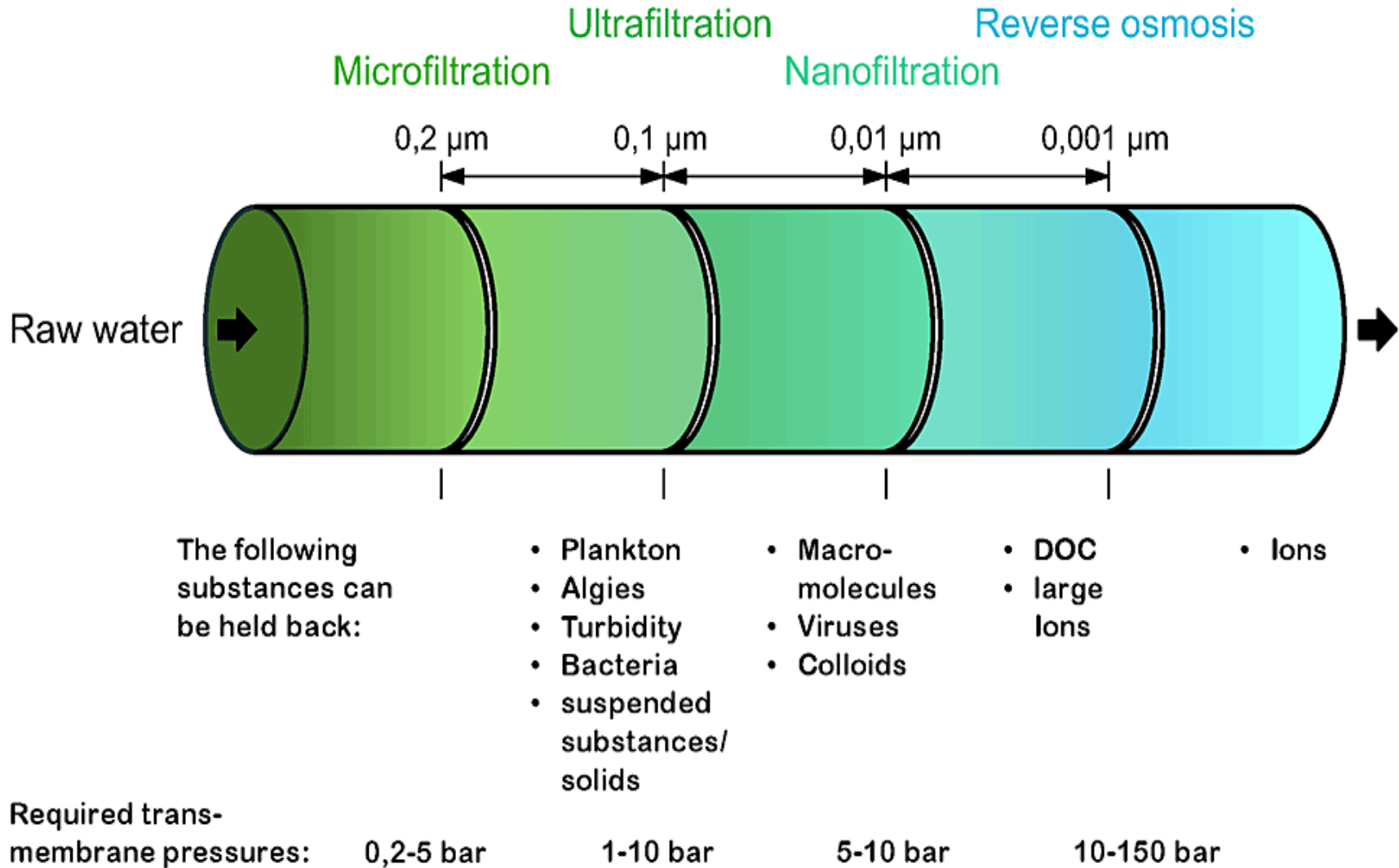
Note: 1 micron (micrometer) = 1×10^{-5} inches = 1×10^4 Angstrom units

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Solids & Suspensions Removal



Solids & Suspensions Removal



Solids & Suspensions Removal

POST-FILTER

- (Activated Carbon) Final polish to remove any objectional tastes and odors from storage tank prior to water consumption or use.

RO MEMBRANE

- Thin Film Composite design. Rejects 98% of the dissolved metals and salts, plus other harmful contaminants.

PRE-FILTER (sediment)

- Removes sediment, rust, dirt and other solid debris.

PRE-FILTER (carbon block)

- Removes chlorine and protects the RO membrane.

Second Carbon Pre-Filter (5-Stage RO only)

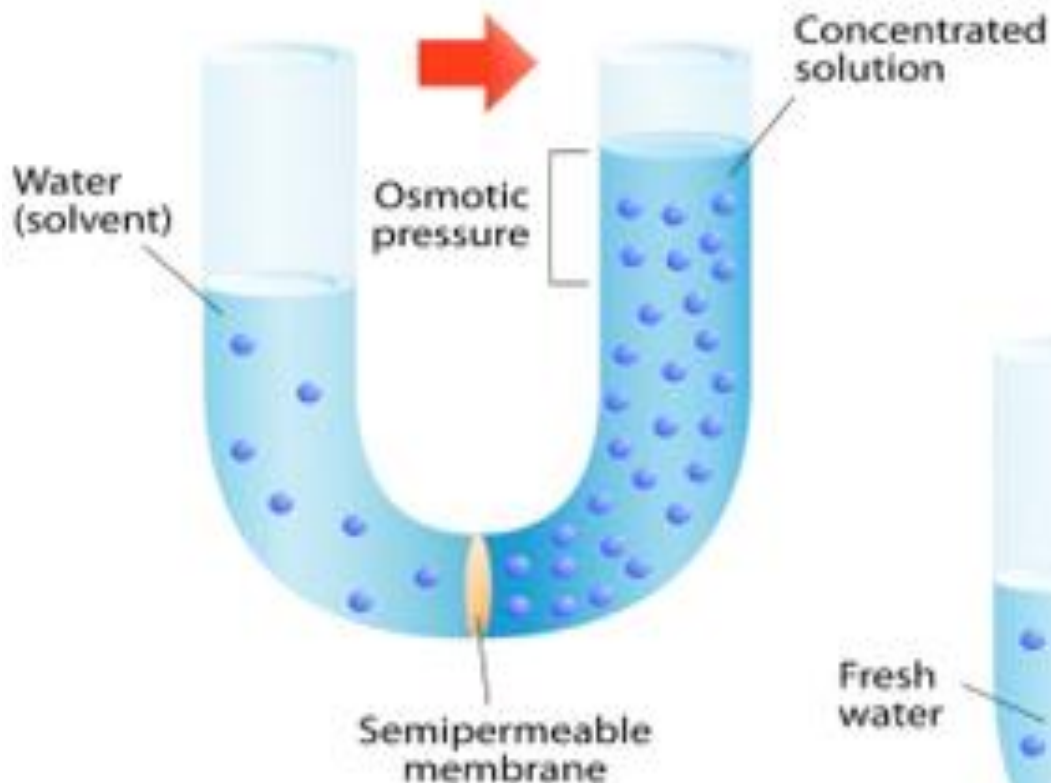
- Additional activated carbon pre-treatment filter.



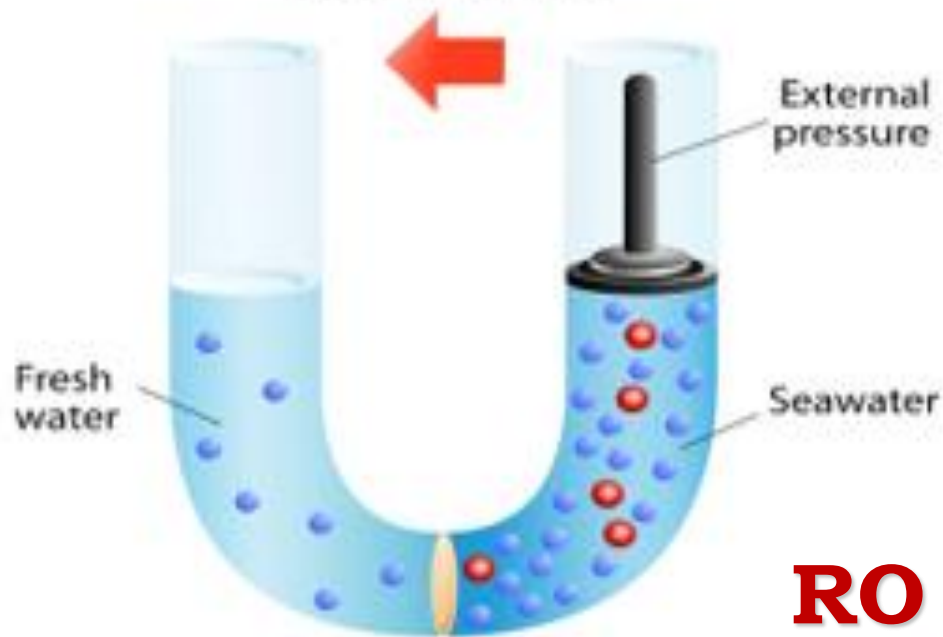
Osmosis VS Reverse Osmosis

Osmosis VS Reverse Osmosis

Osmosis



Reverse osmosis



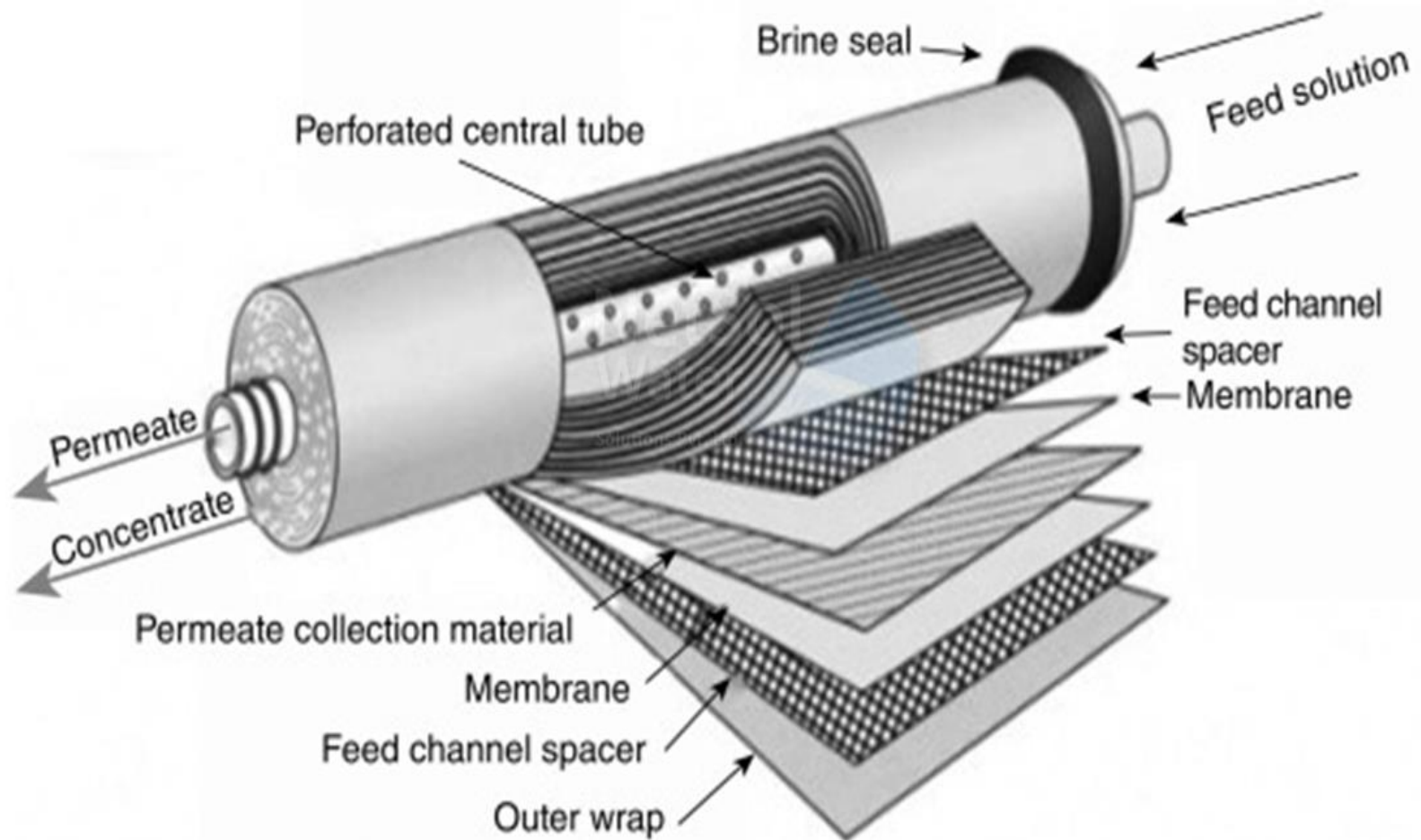
RO

Industrial RO System

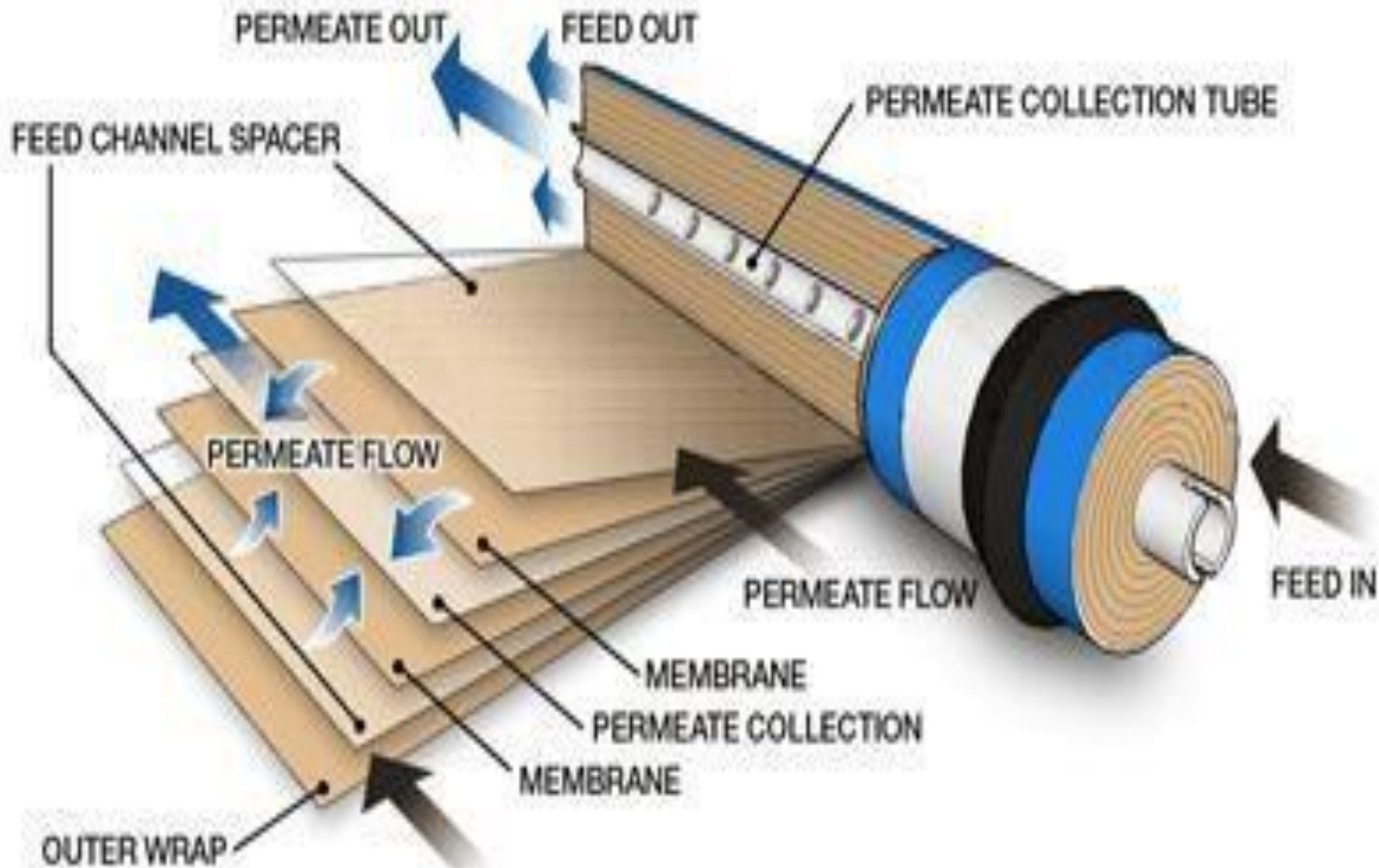
Industrial RO System



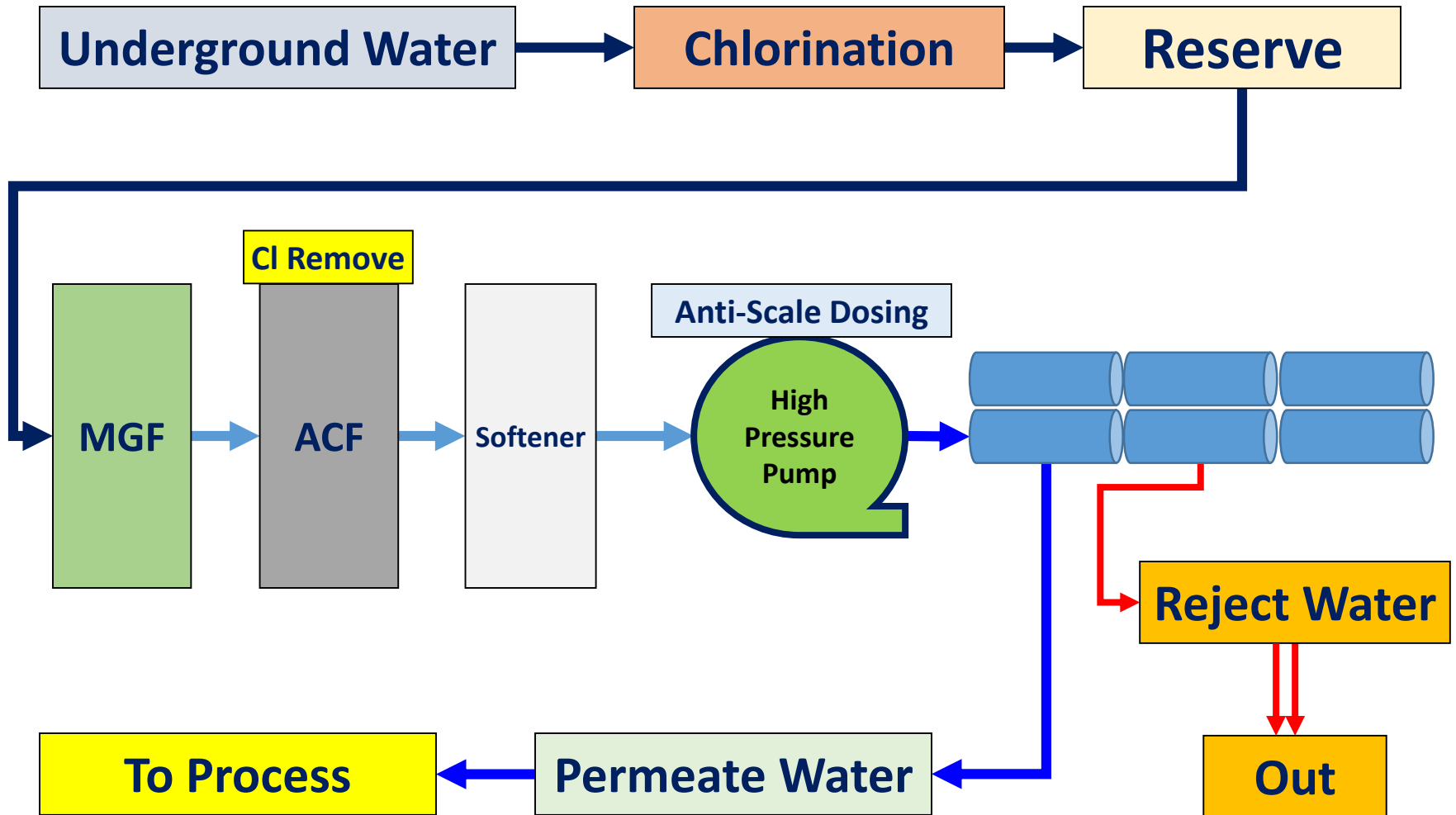
RO Membrane



RO Membrane



Basic Components of RO Plant



Any Question...!?



Any Question...!?

