Tri-functional tanks for desalination processes

CSIC has developed a water filtration installation. It contains tanks designed to perform various functions: water filtration by means of ultrafiltration, water filtration by reverse osmosis and recycling of reverse osmosis membranes. This installation is used, for example, in seawater desalination processes.

Industrial partners from the hydraulic companies are being sought to collaborate through a patent licence agreement.

Recycling reverse osmosis membranes in the tank itself.

There are two types of semipermeable reverse osmosis and ultrafiltration membranes. Once the reverse osmosis membranes are deteriorated, they are transformed into ultrafiltration membranes in the tank itself.

The installation consists of different elements: tanks and as a regulation system, valves and pumps. The different circuits are connected in the same installation. These are:

- **Ultrafiltration circuit** (Figure 1): transforms the raw water which contains particles in ultrafiltered water leaving them retained in the membrane.
- **Backwash circuit**: it is necessary to wash the membranes filled with particles dislodging retained particles.
- **Reverse osmosis circuit** (Figure 1): transforms ultrafiltered water into osmotized water eliminating the brine that is obtained.
- **Recycling circuit**: reconvert degraded reverse osmosis membranes into new ultrafiltration membranes.

Main innovations and advantages

- Installation is flexible in the number of tanks from which it is formed.
- The possibility to perform different functions, without the need to change tank.
- Recycling of reverse osmosis membranes already deteriorated into new ultrafiltration membranes optimizing costs.
- This installation can be used for water filtration, for example, to carry out the desalination of seawater.

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