

CSM-RO

Pre-treatment for clean steam generators



spirax
sarco

First for Steam Solutions

Reverse Osmosis

Reverse Osmosis is a process that is used to remove a wide range of salts to give water of a high purity. Osmosis is a natural process involving fluid flow across a semi-permeable membrane barrier. It is the process by which nutrients feed the cells in our bodies and how water gets to the leaves at the top of trees.

If you separate a solution of salts from pure water using a basic thin semi-permeable membrane like a sausage skin, the pure water passes through the membrane and tries to dilute the salt solution. If the salt solution is connected to a vertical pipe then the progressively diluted solution will fill the pipe until the 'osmotic pressure' drawing the pure water through the membrane is the same as the head pressure of the diluted solution.

This process can be reversed – hence 'Reverse Osmosis' – by applying a higher pressure to the salt solution. Pure water will then pass the other way through the membrane in a process that is easy to visualise as 'filtration' where the filter will only let through the small water molecules and retain almost all of the other molecules. This means that water containing a high level of natural salts can be purified without the need for chemical regenerants such as the acid and caustic used in demin plants.

Reverse Osmosis is therefore considered a much safer route of producing pure water for many commercial and industrial applications. In addition the plant does not need to be taken out of service for regeneration as a demin plant does.

- Water sent to drain kept to a minimum; recovery ratio approx. 75%
- Recirculation allows higher water flow, reducing load on the bearings and keeping pump running cooler
- Controller constantly monitors permeate water quality
- Removal of salts from water typically 95-99.5% dependent on membrane type
- Runs various pre and post flush cycles to maximise membrane life
- Safety controls ensure unit cuts out on low and high pressure, high and low conductivity and full permeate tank signal
- Programming is preset to ensure protection of the system at all times and to maximise pure water quality
- Low energy membranes typically produce permeate water of 10 microSiemens/cm from input water of 500-700 microSiemens/cm



The range at a glance

Type	Input (l/h)	Output @ 75% recovery (l/h)
CSM-RO300	400	300
CSM-RO600	800	600
CSM-RO900	1200	900
CSM-RO1200	1600	1200
CSM-RO1650	2200	1650
CSM-RO2000	2667	2000

The RO unit is available in two options:

Compact standalone unit

Comsoft integrated skid mounted system with a suitable water softener (suffix 's')

Reverse Osmosis Systems

Reverse Osmosis systems, in their basic form, consist of a pressure pump, housing and the membrane. Water is forced into the housing under pressure and the pure water (or permeate) is collected and passed to service.

Reject water (or concentrate) is collected from another outlet and routed to drain, with a portion of the concentrated water recycled back to the inlet of the pump. This means that the portion of water sent to drain is kept to a minimum allowing a recovery ratio of approx. 75% to be achieved without significant fouling of the membrane. The recirculation allows a higher flow of water through the pump reducing the load on its bearings and keeping the pump running cooler. The recirculation on all units is adjustable.

The controller used on the RO system constantly monitors the quality of the permeate water and is also linked with safety controls on the system, to ensure the unit cuts out on low and high pressure, high and low conductivity and full permeate tank signal. It will also run various pre and post flush cycles to maximise the lifetime of the membrane. The constant monitoring is automatic and the programming is all preset to ensure protection of the system at all times and to maximise the quality of the pure water.

RO plants must be supplied with softened, de-chlorinated or de-chlorinated anti scalent dosed water. A duplex softener is recommended for continuous operation. Utilising softened water for the feed to the RO will reduce the scaling potential on the membrane and therefore lengthen its working life. De-chlorination of the feed will reduce oxidation damage to the surface of the membrane. High output reverse osmosis plant offers considerable advantages over traditional deionisation systems, with no acid/caustic consumables nor problems with COSHH compliance. If softened service water is needed elsewhere on the same installation site, concentrate water can be returned to a softened water holding tank, eliminating water wastage.

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