Reverse Osmosis System – CJ Series

Features

- Ultra-compact direct flow reverse osmosis systems
- High flow permeate stream
- Compact dimensions, tall form in mounting case
- Modular design with inter-locking case modules for expansion
- Easy replacement of filter cartridges
- May be used with or without storage tanks
- Display for cartridge change requirement

The CJ series direct flow reverse osmosis systems have found applications in small laboratories, dental and veterinary clinics, for use with sterilisers and autoclaves or as pre-treatment for ultra-pure water or applications requiring endo-toxin or bacteria free waters.

The modular slim line system may be re-configured to accept post RO treatment stages including UV sanitation, sub-micron filtration, deionisation and/or ultra-filtration. Connecting multiple units together is straightforward to provide a complete water treatment package to suit most applications.

Treatment stages use quick connect type in-line encapsulated filter cartridges and industry standard RO membrane pressure vessels. Including:

- 5µm sediment pre-filtration
- 5µm Silver impregnated carbon block filter for dechlorination
- Automatic high pressure reverse osmosis pump
- 1 or 2 thin film reverse osmosis membranes (2012 type)

Operational Specifications

Feedwater temperature range	+15 to +35°C
Feedwater pressure range	350-750kPa
Feedwater maximum TDS (ppm)	250ppm (up to 500ppm with lower performance)
Operating pressure (post boost pump)	600-700kPa

External storage tanks are available to suit these systems and can be sized to account for your water volume requirements. A range of air-pressure tanks with draw-down volumes of 4-80 litres, eliminating a major source of re-contamination and eliminating the need for a re-pressurisation delivery pump. Standard atmospheric storage tanks are also available with integrated re-pressurisation delivery pumps.

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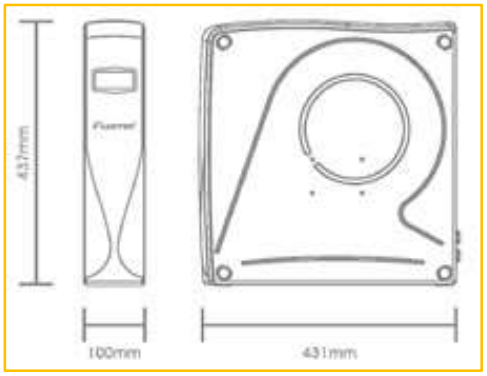
Specifications

Model	*Output (lpd)*	*Pump*	*Membrane*
CJ-50	180	LF-30L	1812 x 1
CJ-200	600	HF-45L	2012 x 1
CJ-400	1200	HF-45L	2012 x 2

Output flow may vary according to pressure, temperature, and feedwater quality



Single module dimensions

Options

- Leak detector and display
- Deionisation polisher stage to improve final water quality
- UV sanitation final sanitation treatment stage
- Feedwater pressure limiting and non-return valve.
- Post RO treatment systems with UV, sub-micron filtration and ultra-filtration stages
- Pressurised storage tanks between 12 and 200 litres (4 – 80 litres drawdown)

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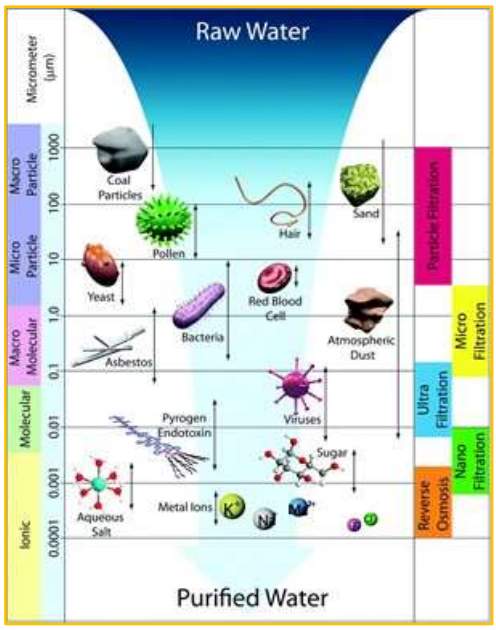
The Reverse Osmosis Process

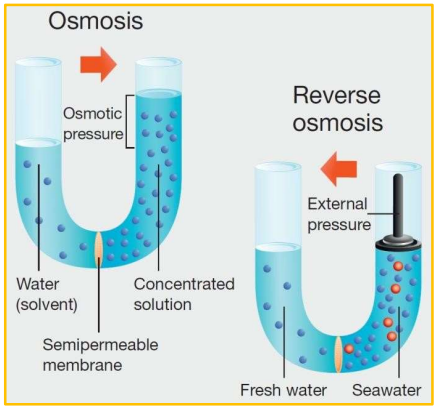


Reverse osmosis systems will typically remove 95 to 99% of incoming inorganic contaminants, up to 97% of organic contaminants such as herbicides and pesticides, and >99% of microorganisms such as yeasts, moulds, bacteria, pyrogens, and virus particles.

Osmosis describes the movement of fluid through a semipermeable membrane from a solution with a low solute concentration to a solution with a higher concentration. Osmosis can be reversed (hence the term Reverse Osmosis) if sufficient pressure is applied to the concentrated side of the membrane. This reversal process is used for water purification and desalination as the membrane structure allows water to pass through, but not larger molecules or ions (like salt).

For the reverse osmosis system to operate effectively, the feedwater must be filtered to remove suspended solids (to around 5 microns) and then de-chlorinated.

An anti-scale process may be required to remove hardness minerals (calcium, magnesium and iron) which would otherwise increase in concentration on the waste side of the membrane to the point where they form scale and foul the membranes.



Pre-treated feedwater is pressurised and forced into a series of membrane and pressure vessel assemblies where the separation of pure water and contaminants occurs. Multiple membranes may be used for the higher flow rates. RO membranes are available for a wide variety of feedwater types and all have a similar physical structure. They differ in membrane polymer type, membrane thickness, surface area, spacer thickness, outer membrane covering and physical size. Surface modified membranes are used in more specialised areas to yield maximum stable performance.

Permeate (purified) water exiting the reverse osmosis membrane may be used directly or polished to remove trace levels of remaining contaminants through:

- Mixed-bed Deionisation for scavenging trace levels of inorganic contaminants
- Organic scavenger resins or UV photo-oxidation to reduce TOC levels
- UV irradiation to sterilise the water
- Membrane degassing to remove any remaining dissolved gases.

Some or all of these technologies can be incorporated into a system design to ensure that final water quality is suitable for the intended purpose.

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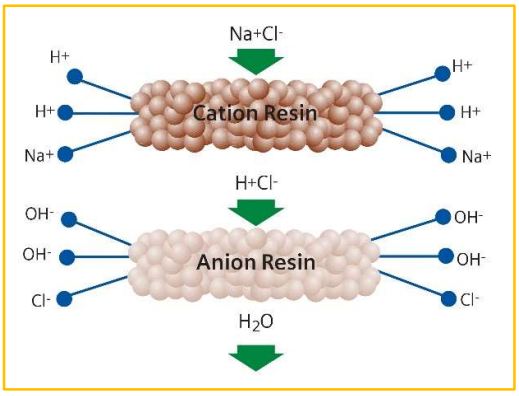

The Deionisation Process

Deionisation systems provide a simple means of producing low conductivity water either directly from a mains feedwater supply or as a polisher stage following reverse osmosis. A typical exchange mixed bed deionisation stage will scavenge trace levels of inorganic contaminants from the source water until exhausted. Deionisation stages incorporate a conductivity/resistivity or TDS monitor to indicate when cartridge performance falls below specification and change-out is required.

Deionisation will not remove organic contaminants, colour, taste of contributors to TOC content, nor will they remove bacteria or endotoxins. If microbial control is required, sub-micron filtration, ultra-filtration or UV sanitisation must be incorporated into the treatment process, typically immediately before the dispensing point.

UV Sanitation

Short wavelength ultra-violet radiation (254nm or in the UVC band) is an effective means of disrupting microbial DNA, removing their ability to reproduce or survive. UV light will kill bacteria, viruses, yeasts and moulds and is most effective when used downstream from a sediment filtration system.

UV sanitation lamps are available to suit a most flow rates and water qualities. Commercial systems generally have single or multi-lamp stainless-steel chambers with separate power supply. Selection criteria include water flow rate, lamp power and UV transmittance of the water stream being treated.

"Pure-Water" and Water Quality

To resolve the use of the term "pure water", several professional organisations have drawn up water quality standards graded according to the intended use for the water. These standards enable end users to define their needs more precisely and evaluate the myriad of purification technologies available without reliance on manufacturer's bias or non-specific brand names. Typical of the currently recognised standards are those of the American Society for Testing and Materials (ASTM), the College of American Pathologists (CAP), the American Chemical Society (ACS), the National Committee for Clinical Laboratory Standards (NCCLS) and the British Pharmacopoeia (BP), all of which are in the public domain.

The predominant measure used in classification systems and throughout most discussions of "purity" refers to the resistivity or conductivity of the water. Since minerals form ions in solution, they increase the electrical conductivity of that solution. To put this into perspective, the calculated conductivity of chemically pure water is 0.0548µS/cm @ 25°C. Typical municipal water supplies have a conductivity of <250µS/cm and permeate water exiting a small reverse osmosis system fed from this mains water will be <15µS/cm. Use of a post reverse osmosis deionisation polisher stages will yield <1.0µS/cm conductivity water.

ROTEK Australia

ROtek Australia Pty Ltd
11/38 Corporate Boulevard
Bayswater VIC 3153

Phone +61 3 9738 2488
Mobile 0430 397 644
email: rotekaustralia@bigpond.com
Web site: www.rotekaustralia.com.au