



Industrial Water Purification

Reverse Osmosis (RO) Preventive Maintenance

RO Maintenance – Troubleshooting

Reverse Osmosis (RO) is simple technology. Water is forced under pressure through a semi-permeable membrane, leaving dissolved and particulate impurities behind.

But RO systems are compound assemblies consisting of multiple technologies, each of which does a necessary job and has specific maintenance requirements. For an RO system to work reliably and economically, the unit and associated equipment *must be routinely maintained*.

RO Preventive Maintenance

Cal Water Provides Economical RO Preventive Maintenance

Experienced Cal Water technicians routinely visit RO systems of any size to monitor unit performance and maintain the pretreatment. During these service visits they make any necessary adjustments, add chemical to feeder tanks, change filters, and repair any minor problems. At the end of each visit, Cal Water technicians update maintenance logs and provide complete documentation of work done. Technicians are available **24/7** at **800-CAL-WATER**.

With Cal Water RO preventive maintenance, an RO unit will consistently provide the optimum quality and quantity of product water within the limits of the system. As an option, Cal Water will also maintain any downstream storage tanks, pumps, deionizers, filters and sterilizers.

RO Maintenance Checklist

A Typical RO PM Checklist:

- Test RO feed water TDS, chlorine and water hardness content
- Check and set pretreatment filter and water softener clocks
- Log RO pump pressure, flow rate and temperature
- Test RO product water TDS and flow rate
- Test RO reject water TDS and flow rate
- Log Recovery %
- Log Rejection %
- Log pressure gauge readings
- Change RO pre-filters
- Check salt/ chemical tank levels and add as needed
- Repair any minor leaks
- Update PM Logs

RO units, large or small need consistent and timely maintenance



RO Service Logs

All maintenance of high purity water systems, routine or otherwise, is logged. If a part is replaced, the part number, date, and the reason for replacement is logged. If chemical is added to a solution feeder the date and quantity is noted. Any maintenance at all is logged no matter how mundane. When troubleshooting, the more information available on the routine operation of the system the better. Cal Water Logging Philosophy: "If it wasn't logged, it wasn't done."

Setting Up an RO PM Service

Establishing Component Baseline Performance

- Cal Water engineers start an RO evaluation by meeting with customer personnel familiar with operation of the water purification system to get their ideas.
- Our engineers inspect the RO system from the raw water inlet to the pure water outlet. They take measurements, make sketches, take pictures, and record all pertinent data including part numbers, descriptions, model numbers, and voltages.
- They perform a 7 point general mineral water analysis on RO feed, brine and product water.
- Our engineers review the installation to assess the probable long-term performance capability, and to report any problems found during the inspection phase to the customer.
- With this data and other tests, we provide our customer with a **System Evaluation** report on the current performance level of all of the equipment in the system.
- We develop an **"As-Built" AutoCAD drawing** of the system from observations, measurements and photographs.
- We use the drawing and notes to write a **Maintenance Manual**, specific to the system, which outlines a PM schedule, service frequency, and all activities necessary to keep the RO equipment in top operating condition. The **PM Service Checklist** is then generated.

Cal Water RO PM Service Checklists and Contracts

Standard Service Visit

- Analyze City water TDS, pH and pressure
- Function of water softener or sequestering agent feeder
- Function of carbon filter or reducing agent feeder
- Check all time clocks and reset if necessary
- Check for hardness and chlorine in RO feed water
- RO pump pressure
- RO product water TDS, pressure, and flow rate
- RO Brine TDS, pressure, and flow rate
- Recovery %
- Rejection %
- Add salt to the water softener brine tank
- Add sequestering agent to feeders
- Add reducing agent to feeders
- Change filters on a schedule or as needed
- General system inspection

Optional Full Pure Water System Maintenance

A Full Pure Water System Maintenance Service Would Include:

- RO Preventive Maintenance service as described above
- Sequentially cleaning RO elements at Cal Water, or if system capable, clean and membranes in place, as needed
- Replace RO elements, as needed
- Provide Exchange Deionizers down stream of the RO unit
- Change U.V. lights every 6 months, 9 months or yearly, depending on requirements
- Replace sub-micron filters
- Change vent filter on storage tank every 6 months
- Periodic full system sanitization including storage tanks and loops every 3, 6, or 12 months, depending on requirements
- Any other water purification service required that is system specific

RO-DI System Trouble Shooting

– NOTE: With a full Cal Water maintenance contract in place, problems can usually be headed off or at least predicted, making emergency troubleshooting unnecessary.

One of the more valuable benefits of purchasing a Cal Water RO preventive maintenance contract is the capability of Cal Water's service technicians to provide complete system troubleshooting. This is especially so at the beginning of a PM service contract. Cal water technicians are experienced in troubleshooting a wide variety of water purification products and equipment.

With over **50 years of experience**, Cal Water technicians and engineers can repair, maintain, and upgrade almost any Reverse Osmosis unit, regardless of manufacture.

New Customer Problems Solved by Cal Water Service Technicians:

- Insufficient water is being produced by the system
- Insufficient water pressure before/after the system
- The RO pump draws too much current
- The RO product water quality is below specification
- The final water quality is below specification
- The portable exchange deionizers don't last
- Bacteria or other Organics are interfering with the process
- Filters are plugging too rapidly
- Hard water is getting to the RO Membranes
- Chlorine is present in the RO feed
- The Recovery rate of the RO is too low
- The water system becomes contaminated within days of sterilization
- Your Problem?*



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<http://www.cal-water.com>

**For More Information Please Call
1(800) CAL-WATER - (800) 225-9283**

Limited Warranty: Cal Water warrants service labor and material for 1 year from the date of work. In case of defect in material, labor, or service, Cal-Water's sole responsibility is for the replacement or repair of the specific defect and cannot be held liable for losses of any kind arising from the defect. (Please see Terms and Conditions of Service)

Example Maintenance Schedule

Multimedia Filter

<u>Maintenance:</u>	<u>Frequency:</u>
1. Check Pressure Drop	every visit
2. Back wash filter	as needed
3. Check and adjust Time Clock	as needed

Carbon Filter

<u>Maintenance:</u>	<u>Frequency:</u>
4. Test for chlorine	every visit
5. Back wash filter	as needed
6. Check and adjust Time Clock	as needed

Water Softener

<u>Maintenance:</u>	<u>Frequency:</u>
7. Check Hardness	every visit
8. Fill Brine Tank	as needed
9. Regenerate Softener	as needed
10. Check and adjust Time Clock	as needed

5 Micron Cartridge Pre-Filters

<u>Maintenance:</u>	<u>Frequency:</u>
11. 1. Check Pressure Drop	every visit
12. 2. Log and replace cartridge	as needed

Sequestering Agent Solution Feeder

<u>Maintenance:</u>	<u>Frequency:</u>
13. Log Chemical level	every visit
14. Log Chemical addition	every visit
15. Replace O rings, check balls and seats every 6 months	

Reverse Osmosis Unit

<u>Maintenance:</u>	<u>Frequency:</u>
16. Log Product water profile*	every visit
17. Log Feed profile*	every visit
18. Log Brine profile*	every visit
19. Log Inspection Report	every visit
20. Log and Report Action Alerts (Profile: TDS, Flow Rate, pH, Pressure)	every visit

Ultraviolet Sterilizers

<u>Maintenance:</u>	<u>Frequency:</u>
21. Log U.V. intensity reading	every visit
22. Replace U.V. lamps	scheduled or at X%
23. Take samples in sterile bottles, giving the time and date	

Sub Micron Cartridge Filters

<u>Maintenance:</u>	<u>Frequency:</u>
24. Check Pressure Drop	every visit
25. Log and replace cartridges	as needed

EDI/Portable Exchange Deionizers

<u>Maintenance:</u>	<u>Frequency:</u>
26. Log water quality	every visit
27. Call and Log Exchanges	as needed
28. Check for leaks	every visit

General: Police area, update logs, provide signed receipt

Notes:



Industrial Water Purification
(800) CAL-WATER
www.cal-water.com

Turn-Key Water Purification

When you buy a Cal water product, you automatically get Cal Water service people as needed, on-site for the first year.

When you buy a Cal Water product you get:

- Quick and professional installation and startup of all equipment.
- Extended warranties in the form of free one year on-site support, as needed, in the Southern California area.
- Concise illustrated Maintenance and Operating manuals on all water treatment equipment from Cal Water. Where more than one type of equipment is being used, as an option Cal Water can provide an operating and maintenance manual on what each piece of equipment does and how it does it, and how it all works together as a system. The manual includes an "As Built" 3-D illustration of the whole system
- Free Telephone and e-mail support on Cal Water equipment installed anywhere in the world for the life of the equipment.

Cal Water

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Recommissioning Orphan Water Purification Systems

Recommissioning "Orphan" Water Purification Systems *Including Operating Manuals*

Cal Water Engineers can survey a water purification system of any size or manufacture and put it back into operation through a process of reverse engineering, research and experience.

The Cost to re-commission a system will vary because each system is different. A firm quote on engineering, parts and labor is provided prior to any work being done.

Manual Contents

Operating and Maintenance procedures
Utility requirements
Verification procedures
Preventive Maintenance Checklist
Spare and replacement part lists and sources

Attached Illustrations

As-Built 3-D illustration
System P & ID
Electrical Schematics
Available literature

System Status Report (included separately)

Recommend upgrades
Identify existing and potential problem areas.

Benefits

Besides the Day-to-day operation of the system, a Cal Water comprehensive manual can help in obtaining FDA approval, certification for ISO-9000 qualification, and Good Manufacturing Practices.

Satisfied Customers

Boeing	Neutrogena
Cosway	Aware Products
Puretec	P-Leiner
Horizon Medical	

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