Chemical-Free Water Treatment For McQuay Evaporative Condenser Rooftop Systems

How can I take advantage of the energy savings of McQuay Evaporative Condenser Rooftop Systems while avoiding the costs and complexity of chemical water treatment?

McQuay evaporative condenser rooftop systems can provide as much as 44% in compressor energy savings compared to competitive air-cooled rooftop units. Until now, chemical water treatment was required to prevent scale build-up and microbial growth in the moisture-laden condenser section of these units. McQuay now offers an alternative: a chemical-free water treatment system that can substantially lower the cost of water treatment, eliminate the use of hazardous chemicals and simplify the water treatment process.

Benefits

- **Eliminates chemical costs.** This system eliminates the use of hazardous chemicals, including scale inhibitors, biocides and corrosion inhibitors. Typical yearly savings range from $1,800 to $2,700 per year for a 150 ton evaporative condenser rooftop unit.*
- **Reduces water consumption costs.** With this system, supply water typically can be cycled through the evaporative system six times before it must be drained off to prevent scale. With chemical treatment systems, only three to four cycles are possible. This represents a water consumption savings of about 10%.*
- **Reduces sanitary sewer costs.** Savings in sanitary sewer costs can be even more dramatic. That's because this system requires *no* sanitary sewer usage—all condenser water, including blow-down, usually can be drained to the storm sewer or used for irrigation (check local codes). This represents a 10 to 15% water cost savings if sewer flow is measured (i.e., credit is given for the water that evaporates during the cooling process) and even more if it is not.*
- **Eliminates hazardous waste concerns.** Because hazardous chemicals are eliminated, so are OSHA and EPA requirements and oversights associated with their use in your facility.
- **Minimizes corrosion.** McQuay uses only stainless steel, copper and PVC in its evaporative condenser plumbing. Clean, chemical-free water, saturated with precipitates by this system, does not attack these materials.
- **Improves system performance.** Low total bacteria count (TBC), cleaner water and virtually no biofilm with this system result in more efficient heat transfer and better system performance.
- **Factory Package**: McQuay factory-installs and commissions the entire chemical-free water treatment package. Commissioning includes a water sample to provide optimum control and make blow-down adjustments, and several, periodic conductivity and TBC tests to check for proper operation.

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How It Works

As a scale inhibitor, the McQuay chemical-free system uses pulsed electromagnetic fields to neutralize the charge on particles suspended in water, causing them to attract to each other rather than to form scale on plumbing and heat transfer surfaces. The particles grow, encapsulate any microorganisms, and precipitate out of solution as a powder. A cyclone separator removes the powder from the system during the blow-down process.

For microbial control, the system uses pulsed electromagnetic fields to attack the cell walls of any microorganisms that are not encapsulated. As a result, TBC is typically 75% less than with chemical treatment systems. In fact, TBC is so low that biofilms are normally prevented.

Easy Maintenance

The McQuay chemical-free water treatment system has no moving parts and is easy to maintain. Inspection and monitoring are only required once or twice per quarter, as follows:

- Check the water conductivity (and clean conductivity sensor if necessary).
- Check total bacteria count (TBC).
- Inspect general operation and controller settings.

A Cleaner Environment

McQuay evaporative condenser rooftop units equipped with a chemical-free water treatment system contribute to a cleaner environment by reducing energy usage and by eliminating the introduction of hazardous chemicals into the waste stream.

LEED Point Available

Chemical-free water treatment systems qualify for a LEED point under the “Innovation” heading, per a Credit Interpretation Request posted on the USGBC website.

12 To 18 Month Payback

The superior performance of the McQuay chemical-free system costs a little more up front than a chemical feed system, tanks and pumps. However the water and chemical savings generally provide a 12-18 month payback, in addition to the financial benefit of cleaner water and heat transfer surfaces.

Table 1 below shows typical yearly water treatment cost savings when using this system on a McQuay 150-ton evaporative condenser rooftop unit.

*Table 1: Typical yearly treatment cost savings with McQuay Chemical-Free Water Treatment**

	Los Angeles	New York City
Typical Chemical Treatment System		
Water Cost	$1,067	$628
Chemical Cost	$2,000	$2,000
Total	$3,067	$2,628
McQuay Chemical-Free Treatment System		
Water Cost	$923	$539
Chemical Cost	$0	$0
Total	$923	$539
Chemical-Free Savings	**$2,144**	**$2,089**
Percent Savings	**70%**	**79%**

Table 2 points out that, while there are water treatment costs associated with evaporative condensers, they are typically small compared to the total energy savings provided by a McQuay Evaporative Condenser unit.

*Table 2: Typical yearly total cost savings with a McQuay 150-ton RPE Evaporative Condenser Rooftop Unit**

	Los Angeles	New York City
Competitive Air-Cooled Unit		
Energy Cost	$30,200	$17,860
Water Cost	$0	$0
Total	$30,200	$17,860
McQuay RPE Unit with Chemical-Free Water Treatment		
Energy Cost	$22,100	$12,375
Water Cost	$923	$539
Total	$23,023	$12,914
RPE Cost Savings	**$7,177**	**$4,946**
Percent Savings	**24%**	**28%**

History

Over 1200 chemical-free water treatment systems using this same design are currently in use on cooling towers and evaporative condensers in the United States. McQuay can provide you with a list of satisfied, repeat customers.

Contact your local McQuay sales representative for more information on how your building environment can benefit from innovative McQuay rooftop systems, or visit www.mcquay.com.

** All energy analysis and comparison charts provided in this document are estimates and have been generated using McQuay Energy Analyzer™ software. Actual customer results may vary. For access to Energy Analyzer software, contact your local McQuay sales representative.*

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