McQuay Evaporative Condenser Rooftop System

How can I benefit from the substantial energy savings of evaporative condensing in a cost-effective, factory-packaged rooftop system?

McQuay RoofPak™ applied rooftop systems can be specified with an evaporative condenser, allowing you to benefit from substantial energy savings at the reduced design and installation costs of a factory-packaged system. Evaporative condensers can save as much as 40% on energy versus air-cooled alternatives, and they often draw less energy than any alternative HVAC system.

Features

- Seven sizes from 75 to 150 tons.
- Blow through (Model RPE) or draw through (Model RDE) cooling.
- Modular flexibility with multiple filter, fan, coil, heating and specialty equipment options to match strict application requirements.
- Factory assembled and tested units minimize field labor for installation and commissioning.
- Walk-in service vestibule with raised floor grate and drain pan contains water connections and most electrical, water treatment and refrigerant service components.

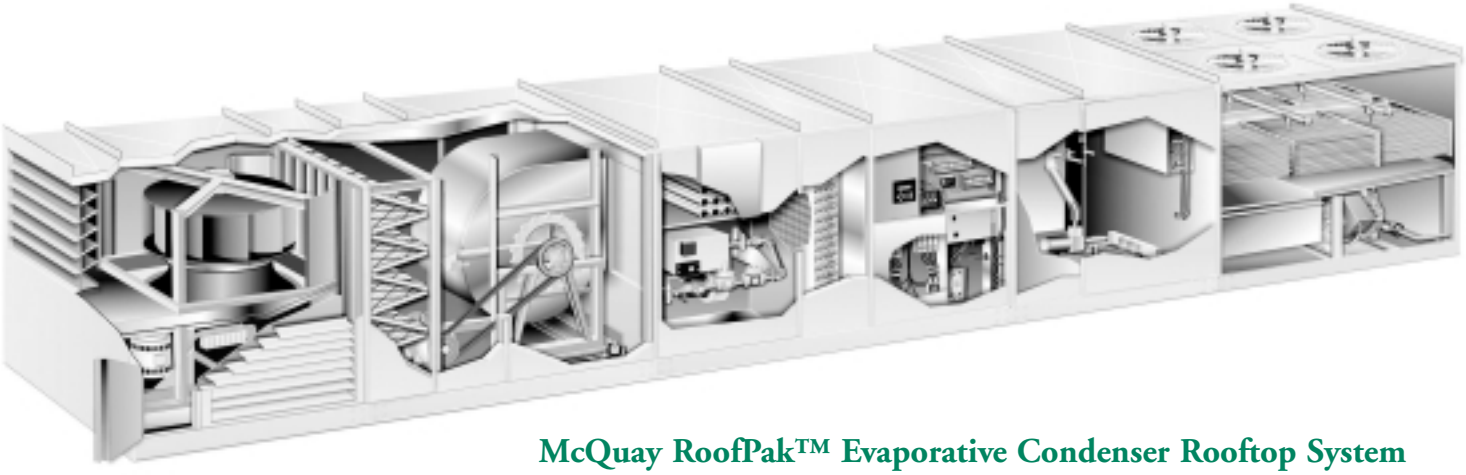
Benefits

Reduced Energy Consumption

- Up to 40% savings in condensing unit energy consumption versus air-cooled alternatives.
- Reduced peak electrical demand at design conditions allows unit electrical service to be downsized for lower installation costs and electrical demand charges.
- Airfoil fan selections require up to 20% less energy than competitive forward curve fans.
- Patented UltraSeal™ low leak dampers minimize losses (0.5% at 1.5" external static pressure).
- Factory-installed variable frequency drives further reduce energy consumption.

Designed For Long Life and Easy Maintenance

- Stainless steel spray enclosure and sump, copper tube bundles and polypropylene spray tree provide superior corrosion resistance.
- All refrigerant service can be performed inside the walk-in service vestibule – away from compressor noise and outdoor conditions.
- Sufficient space is available inside the service vestibule to house water treatment equipment required to prevent scale build-up and microbial growth.
- Easy removal and replacement of spray nozzles, condenser tube bundles and sump reduce service costs and down time.



McQuay RoofPak™ Evaporative Condenser Rooftop System

Model RPE (shown) – 75 to 150 tons (blow through cooling)
Model RDE – 75 to 150 tons (draw through cooling)

McQuay® Air Conditioning

Evaporative Condensing Reduces Energy Consumption

Air-cooled condensers reject heat to the ambient dry bulb (typically 95°F design) as air passes over the condenser surface. Evaporative condensers use a water spray that coats the condenser tubes (Figure 1). As air passes over the tubes, the spray evaporates and cools the tubes down toward the ambient wet bulb (typically 75°F). The lower condensing temperature reduces compressor work and energy consumption, resulting in lower electrical demand and consumption. In addition, the electrical service to the unit can be sized for lower amps to reduce installed costs.

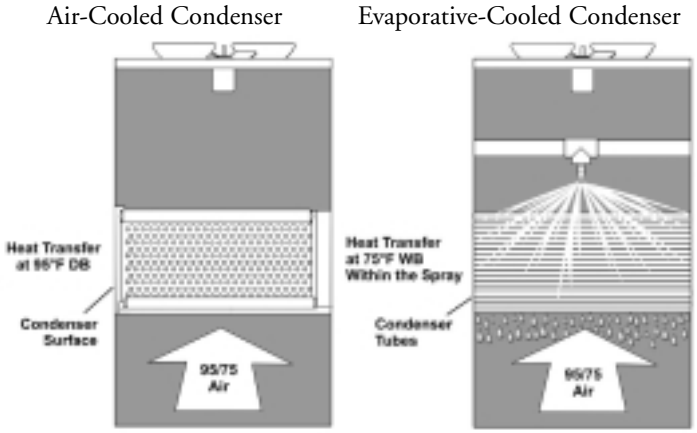


Figure 1 – Evaporative condensers use the cooling effects of evaporation to reduce compressor work and electrical demand and consumption.

Typical Savings Versus Air-Cooled Rooftop Systems*

To illustrate the savings generated by evaporative condensing, consider a two-story shopping mall using several 125-ton VAV rooftop units and occupied 365 days a year. Tables 1 to 3 show the McQuay RPE condensing unit savings if the mall is located in Los Angeles, New York and Las Vegas.

Table 1 – McQuay RPE versus a typical air-cooled rooftop unit for a Los Angeles area mall.

Conditions		Air-Cooled	McQuay RPE
Design Ambient Dry Bulb/Wet Bulb		95°F/72°F	95°F/72°F
Electrical Consumption Rate (per kW Hour)		$0.15	$0.15
Electrical Demand Rate (per kW)		$24	$24
Condensing Unit	Efficiency (kW/ton)	1.15	0.85
	Electrical Cost	$30,200	$22,100
	Percent Savings		27%

Table 2 – McQuay RPE versus a typical air-cooled rooftop for a New York area mall.

Conditions		Air-Cooled	McQuay RPE
Design Ambient Dry Bulb/Wet Bulb		95°F/75°F	95°F/75°F
Electrical Consumption Rate (per kW Hour)		$0.11	$0.11
Electrical Demand Rate (per kW)		$18	$18
Condensing Unit	Efficiency (kW/ton)	1.15	0.88
	Electrical Cost	$17,860	$12,375
	Percent Savings		31%

Table 3 – McQuay RPE versus a typical air-cooled rooftop for a Las Vegas area mall.

Conditions		Air-Cooled	McQuay RPE
Design Ambient Dry Bulb/Wet Bulb		110°F/72°F	110°F/72°F
Electrical Consumption Rate (per kW Hour)		$0.07	$0.07
Electrical Demand Rate (per kW)		$8	$8
Condensing Unit	Efficiency (kW/ton)	1.40	0.85
	Electrical Cost	$19,042	$11,351
	Percent Savings		40%

Tables 1 to 3 show evaporative condensing savings of $5,500 to $8,100 (or 27% to 40%) of your annual condensing unit energy costs versus air-cooled systems.* The superior design of McQuay RoofPak applied rooftop air handling section can significantly increase these savings with features that include:

- More efficient airfoil fan selections versus commonly- used forward curved fans.
- Blow through cooling coil selection and Optimal Air Temperature systems reduce design cfm and fan energy costs.

McQuay RPE Energy Costs Are Competitive With Any HVAC System – Even Water-Cooled Chillers

Using the 0.85 kW/ton condensing unit efficiency, Figure 2 shows a comparison of a McQuay RPE evaporative condenser rooftop system with a 0.55 kW/ton water-cooled chiller system.* In this case, we assumed that the chiller system would have constant flow pumps and that it unloads to 0.46 kW/ton.

The energy performance of the two systems is very comparable (Figure 2). The RPE offers a significant part load advantage and the chiller offers a small full load advantage. Given that most air-conditioning systems operate at 60% load or less over the great majority of a typical year, the McQuay RPE may be the best equipment choice for energy savings and installed costs.

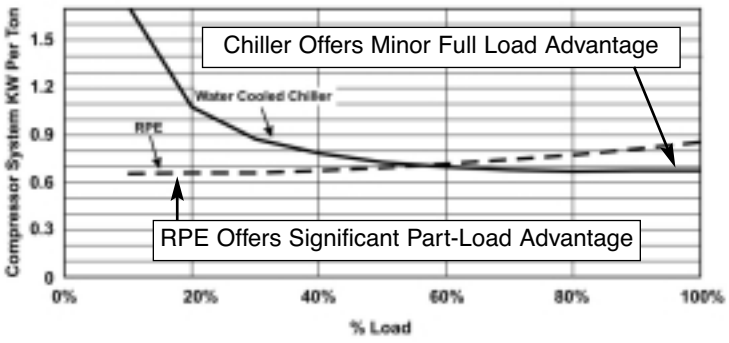
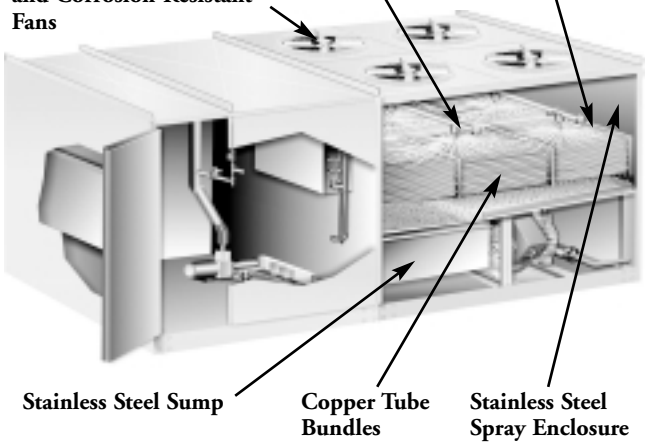


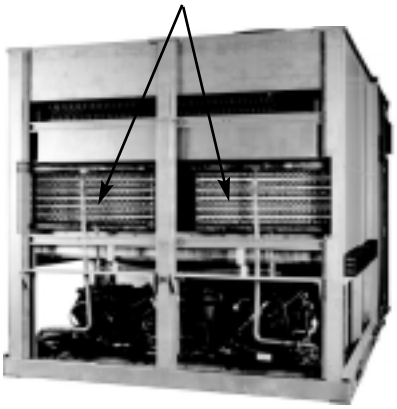
Figure 2 – McQuay RPE unit versus a 0.55 kW/ton water-cooled chiller system.

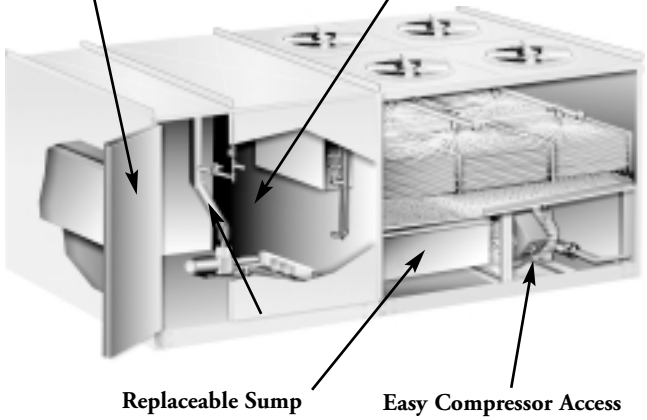
Designed For Long Life And Easy Maintenance

Corrosion Resistant



Easy Maintenance and Service





Walk-In Service Compartment

Perform Most Refrigerant Service In Comfort, Away From Compressor Noise

* 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 Representative. To locate your local McQuay Representative, visit www.mcquay.com or call (800) 432-1342.

McQuay RoofPak™ Applied Rooftop Systems

Total Indoor Environment Control, Only From McQuay

The evaporative condenser system is among the many innovative solutions for rooftop systems from McQuay that help you deliver a superior indoor environment at lower installed, operating and maintenance costs. Other innovations include:

- MicroTech II™ controls with our Protocol Selectability™ feature for easy, low cost integration with the building automation system of your choice.
- Patented DesignFlow™ precision outdoor air control system for precise measurement and control of outdoor air in support of ASHRAE Standard 62.1-1999.
- Patented SuperMod™ 20:1 turndown gas burner for precise temperature control in conventional or high minimum outdoor air applications.
- Fully integrated energy recovery wheel that recovers both heat and moisture from exhaust air for maximum energy and humidification savings, and to comply with ASHRAE Standard 90.1 efficiency guidelines.
- A liquid refrigerant subcooling reheat system for improved dehumidification control.
- Available with alternative non-HCFC refrigerant.

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.

Air-Cooled Packaged Rooftop Systems

Model RPS (shown) – 15 to 135 tons (blow through cooling)
Model RDT – 45 to 135 tons (draw through cooling)

Packaged Air Handlers

Model RAH – 12,000 to 50,000 CFM
Model RDS – 5,000 to 20,000 CFM

Packaged Energy Recovery Systems

Model RPR (shown) – 15 to 60 ton packaged rooftop systems
Model RAR – 5,000 to 15,000 CFM rooftop air handler

McQuay International delivers engineered, flexible solutions for commercial, industrial and institutional HVAC requirements with reliable products, knowledgeable applications expertise and responsive support. McQuay products and services are provided through a worldwide network of dedicated sales and service offices. In addition to Applied Rooftop Systems and air handlers, McQuay is your source for value-added HVAC systems including Centrifugal, Screw and Scroll Compressor Water Chillers (10-2,500 tons), Evaporative Cooled Chillers (60-240 tons), Packaged Chiller Plants, Skyline™ Outdoor Air Handlers (900-25,000 cfm), Destiny™ Indoor Air Handlers (600-15,000 cfm), Vision™ Customized Indoor Air Handlers (900-50,000 cfm), Vertical Self-Contained Floor-By-Floor Units (15-125 tons), Coils, Fan Coils, Unit Ventilators, Water Source Heat Pumps, Packaged Terminal Air Conditioners and Ductless Split Systems. For more information or the name of your local McQuay representative, call 1-800-432-1342 or visit www.mcquay.com.

McQuay® International

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