



The Patented AAON.
**Evaporative-
Cooled Condenser**



Functionality

Factory Testing

Ease of Installation

Ease of Maintenance

Energy Efficiency

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Engineering Innovation and Excellence

Energy Savings over Air-Cooled Condensers

In the evaporative-cooled condensing process, water is sprayed over the condenser coil as the condenser fans draw air across the coil to evaporate the spray and cool the refrigerant tubes toward the ambient wet bulb temperature. Unlike an air-cooled condenser which rejects heat from the refrigerant to the air at the ambient **dry bulb** temperature, an evaporative-cooled condenser rejects heat from the refrigerant to the water at the **wet bulb** temperature which can be 15° to 25°F lower than dry bulb. The lower condensing temperature means that the evaporative-cooled condenser can reject more heat than an air-cooled condenser, while requiring less compressor work and consuming less energy. As a result an evaporative-cooled condenser can be 20% to 40% more efficient than a comparable air-cooled condenser. In addition the electrical service to the unit can be sized for lower amps, reducing installed costs.

Advantages over a conventional evaporative-cooled condenser

include:

- 22-100% less water usage
- 22-100% less chemical usage
- Reduced tendency to form scale in the wetted coil section by integration of a de-superheater coil above the mist eliminators
- Lower energy consumption due to reduced fouling and more efficient heat transfer
- Longer condenser fan motor life due to reduced relative humidity of ambient air



Water Savings with the AAON Evaporative-Cooled Condenser

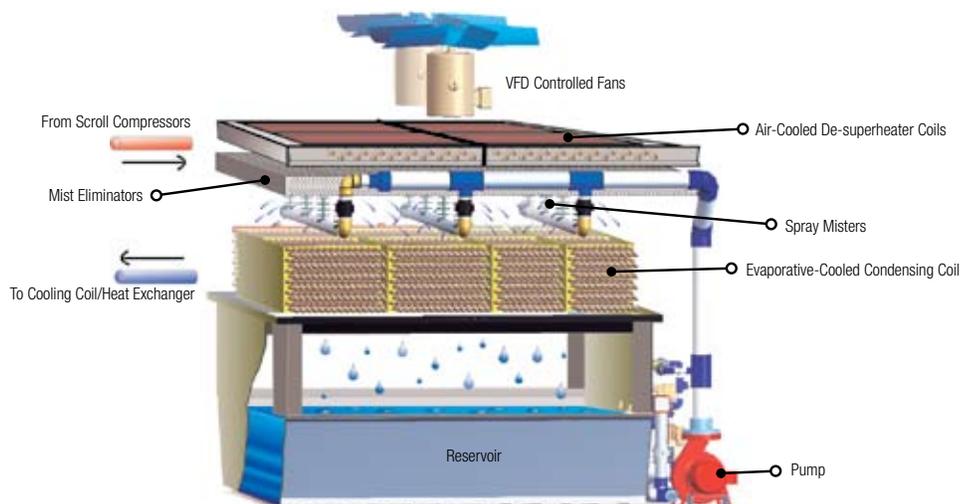
Conventional evaporative-cooled condensers spray water over the tubes containing superheated refrigerant, evaporating the water and depositing scale that fouls the coil and dramatically reduces the effectiveness of heat transfer. However, the patented AAON evaporative-cooled condenser design employs a de-superheater coil above the wetted section to reduce the potential for scale formation (Patent #6,715,312). The de-superheater rejects heat through forced air convection (via the condenser fans), reducing the temperature of the refrigerant to saturation before it enters the condenser coil, and reducing the probability that the water will rapidly evaporate and leave mineral deposits on the coil. This increases the life and efficiency of the condenser coil, and also requires significantly less water for cooling. At ambient temperatures below 33°F

DB all of the heat of rejection can be transferred through the de-superheater, offering 100% water savings. By requiring less cooling water than conventional evaporative-cooled condensers at all ambient conditions, less make-up water is needed, reducing both water and treatment costs.

Reduced Noise with the AAON Evaporative-Cooled Condenser

The air-cooled condenser uses the condenser fans to create a convection current that draws air across the coils to remove heat by transferring it to the air. This process utilizes greater volumetric flow rates than what is required by the evaporative-cooled condenser to evaporate the cooling water. As a result, air-cooled condensers require more fans and larger motors than what is needed in comparable evaporative-cooled condensers. This gives the evaporative-cooled condenser the benefit of quieter operation than a com-

parable air-cooled system. AAON evaporative-cooled condensers are on average, up to 40% quieter than comparable air-cooled condensers at full load. In addition, each condenser fan motor is equipped with a Variable Frequency Drive (VFD) to turn down the motor during periods of reduced load. By allowing the motors to run at lower speeds, this standard feature also decreases the radiated sound, and gives the AAON evaporative-cooled condenser superior noise reduction capabilities under all loading conditions.



Patented Evaporative-Cooled Condenser

Easy Serviceability with the AAON Evaporative-Cooled Condenser

All units utilizing an evaporative-cooled condenser feature a lighted, walk-in service vestibule containing the scroll compressors and all electrical components. For added convenience of service and maintenance in colder climates optional electric baseboard heaters may be installed to heat the service vestibule. On LL Series chiller units, a fan and liquid coil cooling unit can be installed to cool the service vestibule. AAON has also made recirculating water system

access convenient by factory installing the recirculating water pump and three tank water treatment system (2 biocide and 1 scale control) within the vestibule. AAON designed the condenser coil to maximize up-time; each refrigeration circuit features an independent, slide-out condenser coil that is easy to remove and service without requiring a single, large condenser coil to be removed and replaced.

Quality AAON Construction

The condenser sump is all 304 stainless steel, the evaporative-cooled coils are copper and the air-cooled de-superheater coils are completely polymer e-coated to minimize the potential for corrosion. Additional coil protection is offered by the synthetic mist eliminators that separate the de-superheater from the spray trees to deter water from evaporating on the de-superheater surface and depositing minerals. The condenser fans are direct-drive prop fans made of heavy-duty aluminum, adjustable pitch airfoil blades driven by totally enclosed air over (TEAO) condenser fan motors. VFDs control the fans to

maintain head pressure and minimize sound levels at off-design conditions. A concern with conventional evaporative-cooled condensers is damage to the fan motors by infiltration of condensation that develops due to the evaporated water from the condenser section saturating the air. However, by de-superheating the refrigerant above the wetted section and requiring less water for evaporation, the condenser fan motors in an AAON evaporative-cooled condenser will never operate in 100% relative humidity, but in considerably drier air. Each condenser fan motor is also equipped with an electric resistance heater that

activates when the motor is off, raising the temperature above ambient to further prevent condensation from forming inside.

- For low ambient freeze protection, an optional electric resistance sump heater can be factory installed.

Availability

The AAON Evaporative-Cooled Condenser is offered for large commercial applications on RL Series rooftop systems, LL Series chillers, and CL Series condensing units.

AAON Environmentally Friendly HVAC Product Family

Customer Commitment – AAON encourages environmentally responsible design by incorporating many energy saving features into our superior heating and cooling products. In addition to energy efficiency, AAON also offers environmentally friendly R-410A refrigerant capability in all our cooling and heat pump equipment. As countries throughout the world phase out CFC and HCFC refrigerants, R-410A is becoming the global standard and AAON is leading the way!



Rooftop Units



Condensing Units



Air-Cooled or Evaporative-Cooled Chiller



Boiler



Outdoor Air Handling Units



Indoor Air Handling Units



Custom Indoor or Outdoor Air Handling Units



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