The Whalen Company

Whisperline® Single Riser Heating and Cooling Systems

Whisperline® Water-Source and Geothermal Heat Pumps Engineered for Single Riser Integral Pump Applications

- Superior Comfort
- Efficient, clean and quiet operation
- Robust, energy-saving “green” design
- Small footprint...flexible configurations
- Reduced project design requirements
- Lower installation cost...lower O&M cost

The Closer you Look, the More Benefits you See

Whether you're a developer, a contractor or a project engineer, Single Riser heating and cooling systems from Whalen deliver unparalleled efficiency and value to your building project. Here are just some of the notable benefits our systems deliver:

For contractors:

- Reduces installation labor with fewer solder connections, fewer or smaller core drills and fire stop, and more.
- Reduces equipment cost, including less copper requirements for only one riser.
- Reduces the time required to flush the riser.

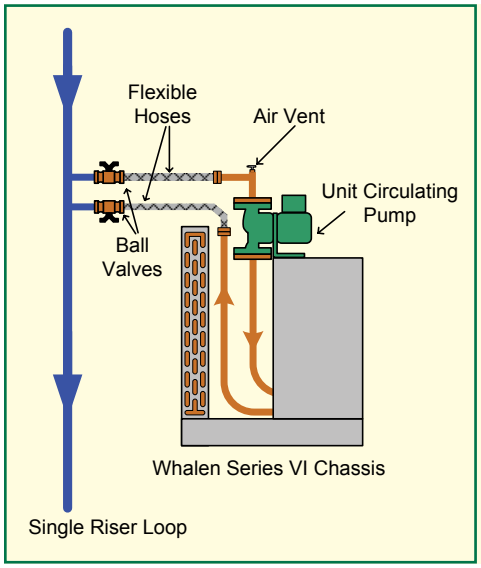
For project engineers:

- Reduces design time:
  - Sizing for riser pressure loss only, not the equipment.
  - Less coordination requirements for riser sizing, plus coring or sleeving.

For building owners and project developers:

- Reduces commissioning time.
- Lowers overall electrical requirements and total pump horsepower for reduced energy costs.
- Transfers more operating cost to tenants.

Whalen Single Riser systems are also ideally suited for "green" building designs and LEED initiatives that contribute to the sustainability of the environment we all share. They help control costs during initial construction as well as the payout phase.



There are no height limitations with Whalen Single Riser units. The most popular designs include mains located on the upper and lower floors.

How the Whalen Single Riser System Works

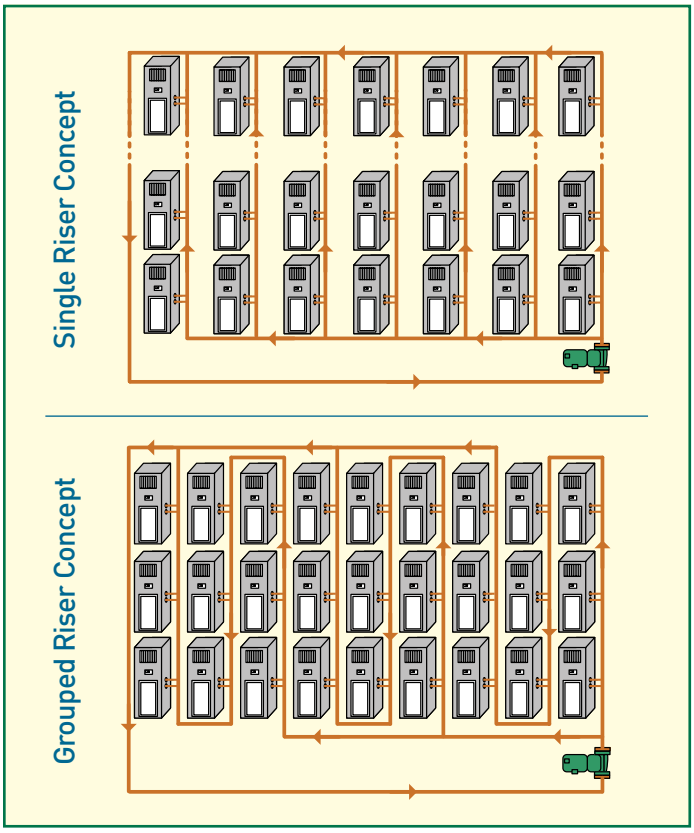
Whalen Single Riser systems feature the Taco® LoadMatch® Design, which is universally recognized for its robust engineering, practical design, plus operating and energy efficiencies. The effectiveness of the concept, which uses only one riser to distribute fluid to a heat pump when two pipes are usually required, allows designers to specify a single riser size for large portions of the system.

- The primary distribution system features a single main loop with a decoupled secondary distribution loop for each heat pump unit.
- Upon demand, a circulator pump provides the specified flow to each terminal unit.
- There are no limits on the number of units on a loop.
- Pipe size is determined by the total load and flow requirements of the loops.
- Loops can be split if loading becomes elevated and smaller pipe sizes are preferred. Splitting loops can reduce installation costs, save energy, and decrease pump horsepower requirements.

Robust System Design

A factory-sized pump is an integral part of each Whalen Single Riser unit, allowing for plug-and-play installation into the system. In addition to achieving the heating and cooling requirements of the building project, this approach eliminates potential sizing errors.

- Primary loops require only a standard head loss calculation by the designer.
- No special sizing techniques are required for boilers, towers and terminal units.



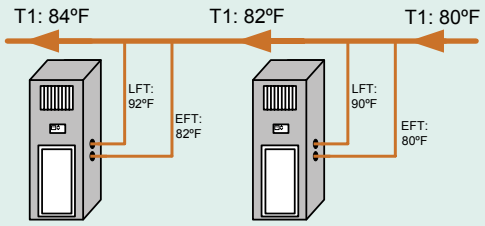
Whalen Single Riser units work flexibly with all building types. One loop connected to each separate riser is fully sufficient for most designs. A common configuration is grouping several risers together on low rise projects.

Understanding Mixed Water Temperature

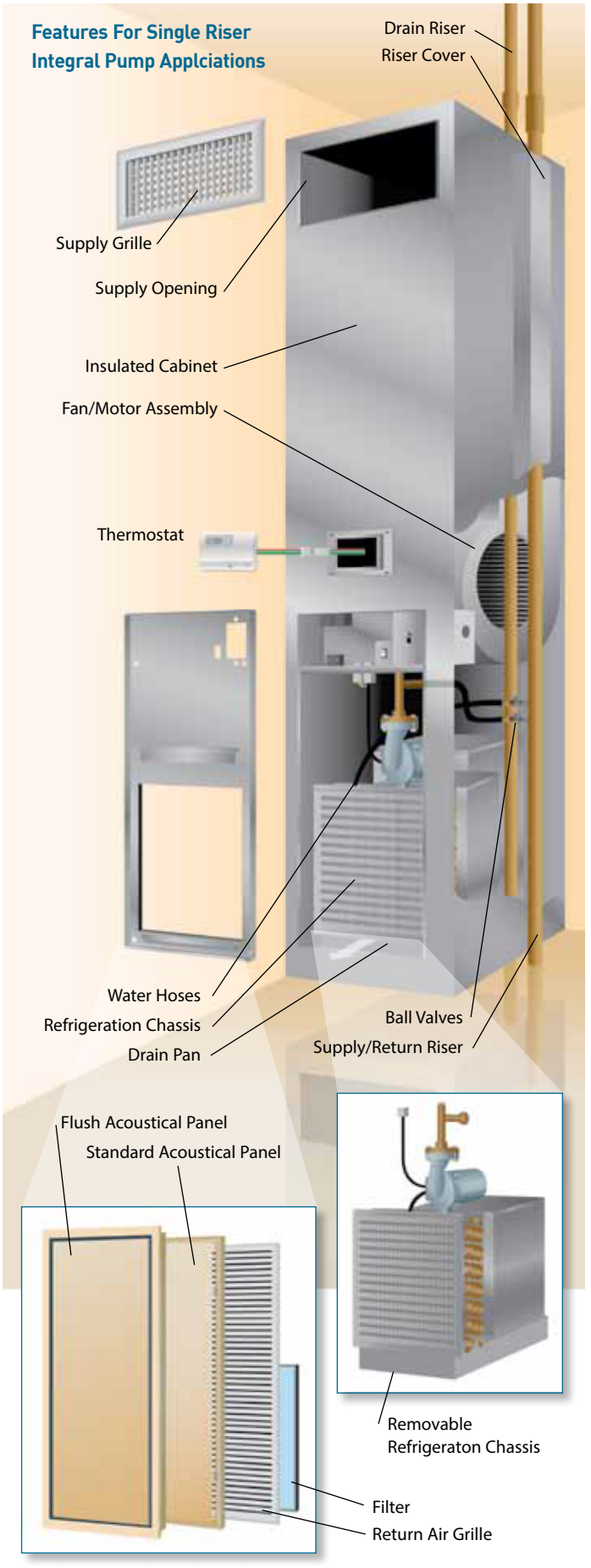
The Whalen Single Riser heat pump system delivers exceptional performance over a wide range of mixed water temperatures.

- The entering/mixed water temperature can be easily calculated and used to selects units that will meet the designed performance requirements.
- A circulating pump contained in each unit is matched to the factory-design flow rate, ensuring adequate flow for each heat pump independent of the mixed water temperature it encounters.

$$\text{Mixed Water Temperature} = \frac{(\text{Unit GPM X LFT}) + (\text{Loop GPM} - \text{Unit GPM}) \times \text{EFT}}{\text{Loop GPM}}$$



How mixed water temperature is calculated between two units on a loop.



Maximizing the “Green” in Green Building Projects

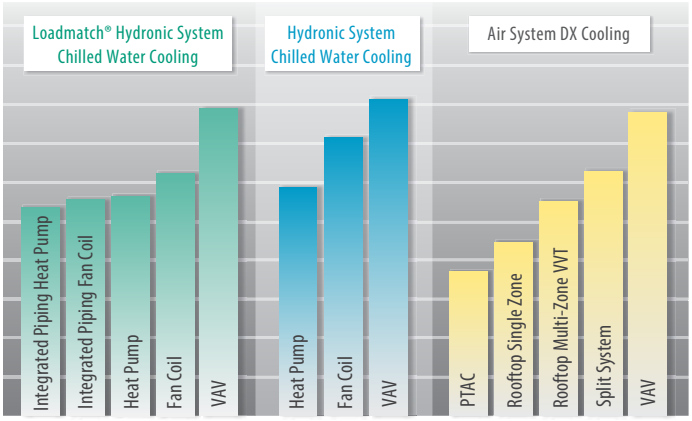
When building “green,” construction costs tend to be higher. Whalen Single Riser systems help control initial construction costs and decrease operating costs later. How? There are fewer system parts and less labor required for installation and calibration.

- 30% to 40% reduction in pipe and fitting costs.
- The use of a factory-configured, low kilowatt circulator in place of expensive, energy-wasting control valves, which provides proper water flow under varying conditions.
- A decreased energy profile due to reduced pump head and a reliable, easily accessible circulating pump.

Plus, compared to other self-balancing systems, Whalen Single Riser systems eliminate the need for the control valves, replacing them with reliable, maintenance-free wet rotor circulators. Our systems also eliminate most balancing valves and the related piping that contribute to high head losses.

The bottom-line result for you: A system that provides better water management with lower energy consumption ... and delivers up to 30% in life-cycle cost savings.

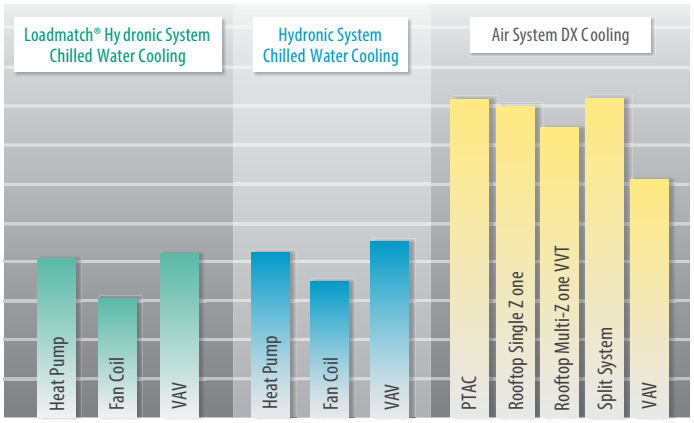
HVAC Systems – Installed Costs



Costs based on sum of mechanical system costs and electrical system costs associated with mechanical systems.

Source: Taco, Inc., Cranston, RI.

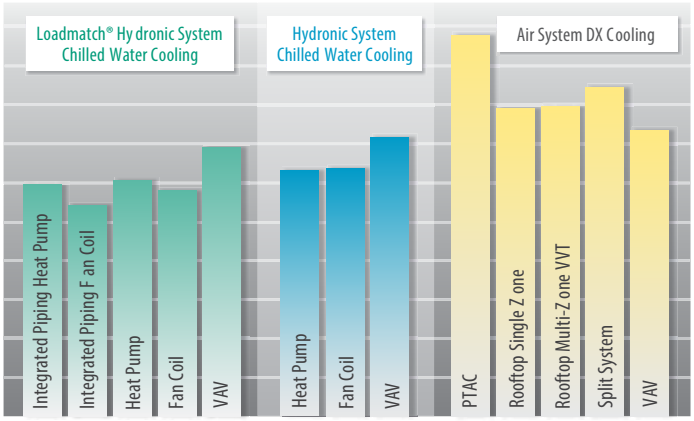
HVAC Systems – Energy Costs



Costs based on average utility rates from APPA and AGA and average US climatic conditions.

Source: Taco, Inc., Cranston, RI.

HVAC Systems – Life-Cycle Costs



Costs based on 20-year life cycle, 8% rate of return, 4% inflation rate, and HVAC construction and maintenance cos survey of maintenance costs.

Source: Taco, Inc., Cranston, RI.

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