



Take the HVAC CHALLENGE™

BY STEVEN G. LIESCHEIDT, P.E., CSI-CCS, CCPR

Central Cooling and Heating



ACROSS

- Using larger, but fewer, pieces of equipment in a central plant generally reduces this cost as well as overall operational costs.
- These pieces of equipment move both chilled and condenser water to and from refrigeration equipment and associated ancillary equipment in a central cooling plant.
- In central cooling and heating system designs, the equipment can be located adjacent to the facility or in these remote plants.
- One of the disadvantages of central plants is that this cost can be higher than decentralized systems.
- This type of automatic control can significantly affect system performance by giving the facility management system the capability to monitor system points and overall system performance.
- Operating a few pieces of this level of equipment gives central plants different benefits from decentralized systems.
- This type of chiller may be single- or double-effect, fired by steam, or direct-fired by gas, oil, or waste heat.
- Ancillary equipment associated with this

type of central heating plant consists primarily of the boiler feed unit, deaerator unit, and possibly a surge tank and/or heat exchanger.

- This central equipment factor takes into account that the simultaneous peak loads for the entire portion of the building is less than the sum of the individual cooling and heating loads of the spaces that make up the building.
- This peak load time is affected by outside ventilation, outside dry and wet bulb temperature, period of occupancy, interior equipment heat gain, and exposure.
- Ancillary equipment in these central plants consists primarily of pumps and possibly heat exchangers.
- This peak load has less opportunity to accommodate a diversity factor so equipment will most likely be selected on the sum of individual heating loads.
- Some central boiler plants require this level of operator to comply with codes and standards.
- Along with noise transmission into a space, this also needs to be taken into account when central plant equipment is installed

in buildings, especially if the central plant is near sensitive spaces.

- With appropriate controls, this can be monitored for the entire chilled water plant, thereby allowing the plant operator to determine the overall operating efficiency of the plant.

DOWN

- This type of condenser passes outside air over coils sprayed with water, thereby taking advantage of adiabatic saturation to lower the condensing temperature.
- One of the many advantages of using central plants is that it is more convenient to provide back-up fuel sources and this type of capability for capacity and redundancy.
- This piece of equipment adds heat to the working medium, which is then distributed throughout the building(s) and/or campus in a central plant application.
- One of the disadvantages of central plants is that these requirements are increased.
- Strategically selecting different sized equipment for a central plant can provide better capability and efficiency for these levels of cooling and heating loads.
- This type of condenser passes outside air over a dry coil to condense the refrigerant.
- All instrument operations where cooling or heating output are measured should have instrumentation calibration that is traceable to this organization.
- This requirement for mechanical and electrical equipment in a building generally ranges from 6% to 9% for central plants.

To brush up on the facts behind this month's clues, refer to Chapter 4 ("Central Cooling and Heating") in the 2004 ASHRAE Handbook — HVAC Systems and Equipment.

Liescheidt is owner of SPPEC-SS Consulting, LLC in St. Louis. E-mail him at steve@sbcglobal.net.



Solution to January's HVAC Challenge™

