

## How to model Chiller pump in baseline

"The baseline design pump power shall be 22 W/gpm. Chilled-water systems with a cooling capacity of 300 tons or more shall be modeled as primary/secondary systems with variable-speed drives on the secondary pumping loop. Chilled-water pumps in systems serving less than 300 tons cooling capacity shall be modeled as primary/secondary systems with secondary pump riding the pump curve."

Ans: First, in the context of 90.1, "variable flow" does not necessarily mean variable speed. It just means riding the pump curve with a bypass to minimize pumping pressure drops through the loop during part-load operation.

App. G Chilled Water Modeling <=300 tons

1. Create a chilled water circulation loop and name it something like "Pri CHW Loop."
2. Create another chilled water circulation loop and name it something like "Sec CHW Loop."
  - a. Change the Loop Sub-type of this loop to Secondary and choose "Pri CHW Loop" as the primary loop.
3. Create a circulation pump and name it something like "Sec CHW Pump."
  - a. Set this pump as variable speed. I believe you are allowed to set the minimum speed to 50% for App. G. (someone here on the list can correct me on this if I'm wrong).
  - b. By default, the valve on this loop is three-way and will circulate water directly back to the primary loop as long as there are two-way valves at your terminal units (AHU coils, FCUs, etc).
  - c. Attach this pump to the Sec CHW Loop.
  - d. Change the loop head sensor location to "at coils."
4. Create a condenser water loop and CW pump and attach the pump to the loop.
  - a. Also create an open tower heat rejection device and attach it to your condenser water loop.
5. Create 1 primary chilled water pump per chiller. They won't be attached to anything yet and will be at the bottom of the component tree.
  - a. The default for a pump is "One-Speed." This is fine and the pump will act as a constant volume pump with the three-way valve on the secondary loop.
6. Create a water-cooled chiller and choose the "Pri CHW Loop 1" and "water-cooled."

a. Since there is no pump attached to the primary loop, you will be required to select a pump for the chiller.

b. You will also be required to select the Condenser water loop

7. Now what you have to do is size your pumps so the total pump energy is 22 W/pm. You will want to do something like 4-5 W/gpm for each primary pump and use the remaining for the secondary pump.

This system is primary/secondary with constant flow through each chiller and variable speed/variable flow through the secondary loop. Since each chiller has a pump directly attached to it, each primary pump will automatically cycle on and off with the chillers.