



TECH TIP #31

ELECTRIC CONDENSATE PUMP SELECTION

A condensate pump is used to collect and return condensate directly to a deaerator/boiler feed tank. It is always controlled by the float switch within its receiver and is never controlled by the boiler mounted level controller. The condensate is pumped only when its receiver is full and not on boiler water level demand. On the other hand, boiler feed pumps are always controlled by the water level controller, typically a McDonnell & Miller #150 LWCO/pump control. See [TECHTIPS #10](#) for a thorough discussion on sizing and selection of boiler feed pumps.

A few important factors to remember when selecting a condensate return pump.

1. The gpm pumping capacity is typically 2-3 times the system condensing rate that the unit will collect. This rule of thumb is typical on small 10-30 gallon receiver tanks. On large condensate collection tanks, a system heat balance is worth reviewing. A capacity of 1-1/2 times the condensing rate may be adequate. This oversizing allows the pump to run 1/3 - 1/2 of an hour under full load conditions.
2. Consider a duplex unit with two pumps and a mechanical alternator. Although a small system may be fine with a single pump and float switch, the duplex unit affords a back up pump and extra capacity. The typical alternator will alternate the lead-lag pump on each cycle and start the lag pump if the lead pump either can't keep up with the load or fails to run for some reason.
3. When calculating the pump discharge pressure, pay attention to grossly overestimating the system head. Many a condensate pump cavitates itself to an early grave due to the system head being far less than what was specified, see [TECHTIPS #28.Cavitation](#).
4. Pump Accessories: We always recommend these five piping accessories with every condensate pump.
 - a. Discharge pressure gauge: A gauge installed on the discharge side of the condensate pump will allow you to double check the back pressure the pump is working against; system head. You can determine how many gpm the pump is moving with a pump curve, see if the pump performance has changed over time or if the back pressure has increased.....possibly through a leaking steam trap elsewhere on the condensate return system.
 - b. A good quality spring-loaded check valve. We always recommend the Durabla SCV stainless steel check valve. The few extra bucks on the front end will save pump seals, electricity and midnight trouble calls.
 - c. A ball valve or a globe valve on the pump discharge to throttle the pump a bit if need be. If the gauge you installed shows that the pump has far less system head than the pump is designed to work against you will need to throttle back the pump, again see the Cavitation TECHTIPS discussion for details.
 - d. A thermometer in the condensate tank is always helpful to see if you have leaking traps feeding your condensate pump return unit.
 - e. A gauge glass set installed on the tank (unless you have Superman's X-ray vision) will help you troubleshoot the system and the return pumps.

ADVANCED TECHTIPS.....Although the above discussion centers on the typical electric condensate pump, Pressure Powered Pumps (PPP) are becoming more and more popular due to their ability to handle extremely hot condensate without cavitation and lack of maintenance. On a typical low pressure system, the PPP may not be economically viable due to their higher cost, but on larger central plant steam systems they are worth a close look. For details, see [TECHTIPS#27 & page 184,Section 4](#) of this catalog.