

Are Boiler Feed Pump Suction Strainers a Good Idea?

It is often asked whether a pump suction strainer is necessary or recommended. The purpose of a suction strainer is to act as a particulate strainer or filter ahead of the pump. This prevents large particles from entering the pump.

Before the introduction of the low-flow/high-head multi-stage centrifugal type pump, turbine type pumps were used almost exclusively for on/off boiler feed service for steam boilers. The turbine pump impeller was designed with very close tolerances within the pump. Any grit or sediment that entered the pump would result in accelerated erosion of these close-tolerance areas, leading to premature pump wear and loss of performance. These pump characteristics made the use of a strainer a necessity with a turbine type pump.

A centrifugal pump does not have these close tolerances, and therefore the use of a strainer at the inlet is not mandatory. Grit and sediment can pass through the pump without causing harm to the pump.

Below is a list of considerations regarding the use of suction strainers:

1. **Suction Losses:** The addition of a strainer in the suction line of a pump increases the losses in the suction line, thereby decreasing the NPSH available to the pump. As the strainer fills with particles, the pressure drop across the strainer increases, further reducing the NPSH available. This situation becomes more critical as the temperature of the pumped water increases. When a feedwater pump is pumping from a deaerator, the water is already at the flash point, and any increase in the suction losses could lead to a flashing condition and pump cavitation.
2. **Increased system maintenance:** Because of the reason stated above, it is important that the strainer basket be checked regularly. If the installation is in a remote area and maintenance checks are rare, a clogged strainer will eventually lead to pump failure and a boiler low water condition.
3. **Can particles get into the pump without a strainer?:** BFS utilizes an anti-sludge suction connection on all deaerators and boiler feed tanks. This connection has an internal projection from the tank bottom of 2" to 3". This prevents any sediment and large particles from leaving the tank through the suction opening. In BFS deaerators, the water entering the deaerator must travel through a series of spray valves, baffles, trays and other restricted flow paths before deaeration is complete and the water is ready for use. The number and size of the particles that will make it through this path and into the storage area is limited.

It is BFS' conclusion that any benefit of a suction strainer is far outweighed by the risks which can lead to pump failures and other system problems.