CHARLOTTE PIPE AND FOUNDRY COMPANY

Technical Bulletin #180517

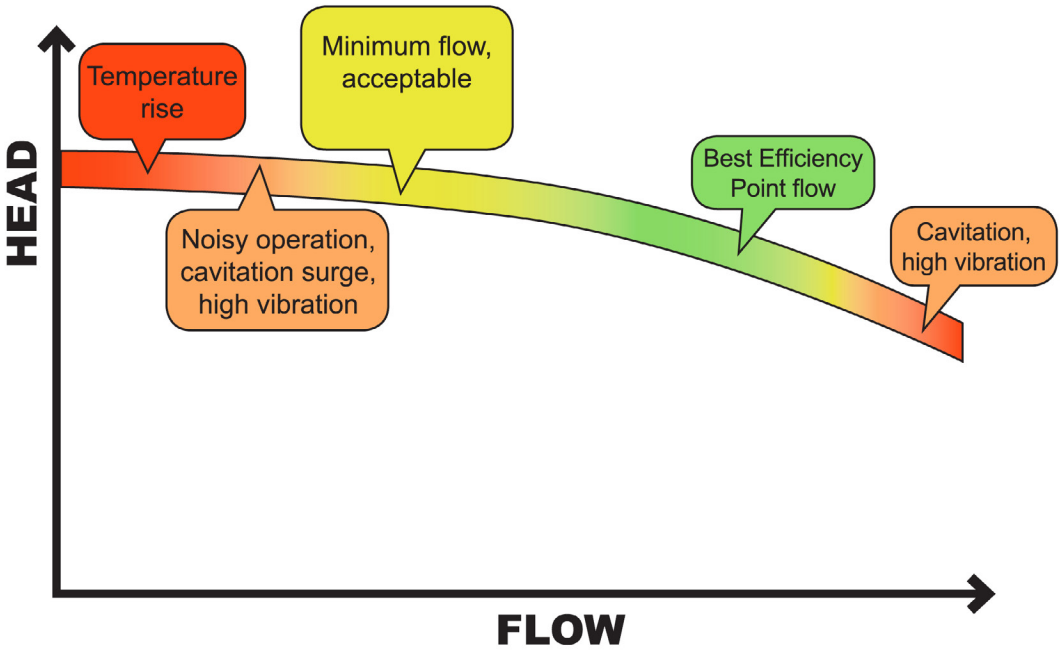
Dead-Headed Pumps & Piping Systems Damage/Failure

What is a dead-headed pump?

A dead-head occurs when a pump operates with no flow through the pump due to a closed discharge valve or line blockage. The danger of deadheading a pump is that, as the liquid rotates, frictional forces cause its temperature to rise to the point where it vaporizes. This can result in a failure of the piping system. Deadheaded pumps have been known to explode due to steam generation.

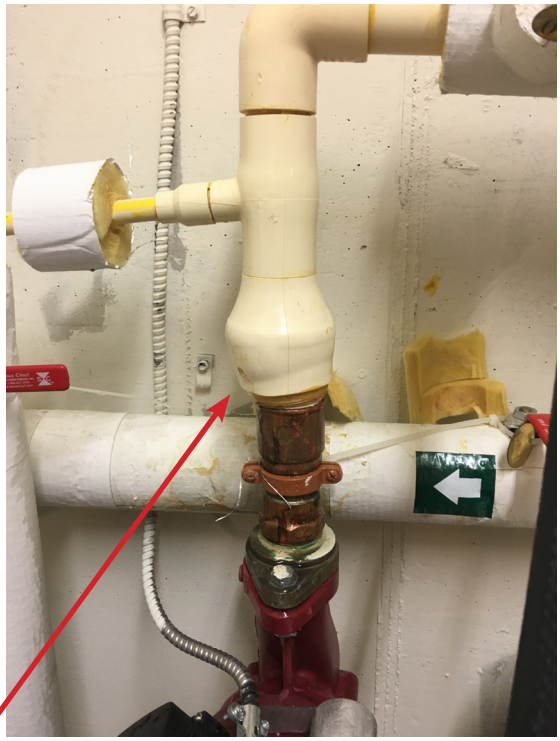
Avoiding a dead-headed pump

A pump must be controlled by throttling the discharge to obtain the optimal operating point. The operating point must always fall on the pump curve to prevent cavitation and system damage. When a pump is operated very close to dead-head, the discharge flow is throttled and reduced. With nowhere to go, the fluid inside the pump is recirculated. This results in noise generation, erosion of piping components, increased fluid temperatures and the possibility of steam generation.



Things to note

- Piping systems are dynamic and must be engineered and operated correctly to prevent damage to system components, system failure and property damage. A dead-headed pump is one example of a condition that can result in system failure.
- PVC has a maximum operating temperature of 140°F and CPVC 180°F. Temperatures in excess of these operating limits will damage PVC and CPVC pipe and fittings and may result in system failure or property damage.



fitting distorted due to excessive temperature

recirculating pump

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