Design of a Steam Condensate Pumping System

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***Abstract*— The project work considers design of a pumping system for steam condensate operating at a pressure of 4 bar. The pumping system is designed to transfer steam condensate (saturated liquid) operating at 143.6°C between two storage tanks. Developing pumping systems for critical process systems require special attention. Critical process system is one wherein failure of the system due to incorrect equipment selection or incorrect operation can have a huge impact on safety and/or have a huge environmental impact. Developing such process critical systems require the use of engineering standards and application of process safety management systems. In this project, steam condensate is operating at high temperature and therefore failure of the either material or equipment could pose a serious threat to the environment and/or mankind. In this project, emphasis is given to system development and the various steps in determining the pump specifications. The importance of net positive suction head (NPSH) calculations are considered in the analysis. DuPont process safety management (PSM) engineering standards are employed in selecting the appropriate materials. An excel model is developed to simulate the required head for various flow rates, pipe dimensions and tank pressures. The model can be used to develop system curve and pump curve can be superimposed on the system curve to choose the right pump for the given application.**

***Index Terms*—Design of pumping system, NPSH, cavitation, pumping model, process critical systems.**

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