

USING STANDARD PUMPS AS TURBINES

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Abstract: A low cost alternative for small hydropower resources is to use pumps as turbines. Pumps are produced in large quantities and in various types and sizes, being available for a large domain of heads and flows (while turbines are designed for each site). Pumps have short delivery time and low cost, they are easy to install and the pump-motor system can be used entirely as turbine-generator unit. First experiments on using pumps as turbines were realized in 1930. Because of the ecological and environmental restrictions in energy production, the use of small hydropower resources will be economical in the future. Standard pumps can be used in hydro systems when installing or upgrading small hydropower plants. Tests showed that pumps operating backwards could compete with turbines, with high efficiency in ranges of relatively small power output. Usually the manufacturers present the normal operational characteristics as pump and very rare as turbine. The purpose of this paper is to obtain the operating parameters of a centrifugal pump used as turbine. This information will then be useful when choosing a standard pump to equip a small hydropower plant. In order to determine the pump's characteristic as turbine, we used a closed circuit experimental setup in which the admission pressure head was realized with another pump. All the hydraulic and electric parameters were analogical and digital measured to determine the energetic performances of the centrifugal pump used as turbine.

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