



Effects of the Boiler Outlet Pressure on the Performance of a Cogeneration Rankine Cycle

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Abstract : This article presents a study that aims to achieve an increase in the efficiency of the Rankine cycle with cogeneration by studying the influence of the variation of the turbine inlet pressure after leaving the boiler, taking into account the maximum and minimum pressures that could actually occur. For this purpose, a spreadsheet with thermodynamic tables was used to determine the thermodynamic states and to create case studies to analyze the behavior of the power developed by the turbine and the cycle utilization factor. An exergetic study of the cycle was also made with the variation of the mentioned parameter in order to find the levels of exergy destroyed by component at the moment of varying the input parameter. Once all the corresponding calculations had been made, it was observed that as we increased the value of the turbine inlet pressure, both the utilization factor and the power delivered by the turbine increased, on the other hand, the heat input to the boiler decreased as the boiler outlet pressure increased. From this it is possible to draw several conclusions and among these it stands out as the work and the utilization factor increases with pressure, it is possible to make a Rankine cycle with cogeneration more efficient if we manage to control the output pressures of the boiler.

Keywords: Cogeneration, Exergy, Exergy destroyed, Utilization factor, spreadsheet, cycle Rankine, efficiency.

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