

Multi-Objective Exergy Optimization of an Organic Rankine Cycle with Cyclohexane as Working Fluid

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Abstract : In this study, an Organic Rankine Cycle (ORC) with Cyclohexane working fluid is proposed for cogeneration in the cement industry. In this regard: first, a parametric study is conducted to evaluate the effects of some key parameters on the system performances. Next, single and multi-objective optimizations are performed to achieve the system optimal design. The optimization considers the exergy efficiency, the cost per exergy unit and the environmental impact of the net produced power as objective functions. Finally, exergy, exergoeconomic and exergoenvironmental analysis of the cycle is carried out at the optimum operating conditions. The results show that the turbine inlet pressure, the pinch point temperature difference and the heat transfer fluid temperature have significant effects on the performances of the ORC system.

Keywords : organic rankine cycle, multi-objective optimization, exergy, exergoeconomic, exergoenvironmental, multi-objective optimisation, organic rankine cycle, cement plant

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