

Abstract

Design optimization of a (heat recovery steam generator) HRSG is essential due to its direct impact on large power generation combined cycles. This study is aimed at giving a thermodynamic comparison between the optimums of three configurations of HRSG operating at exhaust gas temperature (TOT) from 350 °C to 650 °C. The optimization results, using PSO (Particle Swarm Optimization) method, show that adding another pressure level allows achieving a higher pressure at the inlet of high pressure turbine, producing more steam quantities, destroying less exergy and finally producing more specific work independently of TOT. For a given value of 600 °C representative of TOT of recent gas turbines, an addition of a pressure level is shown to increase the specific work of about 17 kJ/kg, representing a benefit of about 10% for the steam cycle, whereas a third pressure level results in 8 kJ/kg increase in the specific work, corresponding to 4% in the steam cycle