

Simulation of organic rankine cycle through fluegas to large scale electricity generation purpose

ABSTRACT

A simulation model of Organic Rankine Cycle (ORC) was developed with HYSYS software driven by R245fa, with NOVEC7000 and R141b as working fluids and Fluegas of boilers as a heat source of shell and tube Heat Exchanger to generate large scale electricity. The initial working condition was in subcooled liquid and steady state condition. R141b was found to generate the highest electricity power increment in specific mass flow rates and inlet pressures of Expander because of approaching its critical temperature to inlet Fluegas temperature. However, in terms of economic considerations and cost of shell and tube Heat Exchanger that related to total heat transfer capacity, NOVEC7000 is the optimum selection. Furthermore, R245fa has the highest total efficiency of ORC compared with other working fluids in this study.

Keyword: Organic rankine cycle; Fluegas; Electricity power; Working fluid