

Thermodynamic Analysis of GT Cycle with Naphtha or Natural Gas as the Fuel: A Thermodynamic Comparison

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Abstract : In this paper, a comparative study is done between two fuels, naphtha and natural gas (NG), for a gas turbine (GT) plant of 32.5 MW with the same thermodynamic configuration. From the energy analysis, it is confirmed that the turbine inlet temperature (TIT) of the gas turbine in the case of natural gas is higher as compared to naphtha, and hence the isentropic efficiency of the turbine is better. The result from the exergy analysis also confirms that due to high turbine inlet temperature in the case of natural gas, exergy destruction in combustion chamber is less. But comparing two fuels for overall analysis, naphtha has higher energy and exergetic efficiency as compared to natural gas.

Keywords : exergy analysis, gas turbine, naphtha, natural gas

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