

HOMEWORK PROBLEM: Flow Exergy HW#2

Given:

Reconsider the superheat power cycle with states as indicated in Flow Exergy HW#1. Again the environment is at $T_0 = 300$ K and $P_0 = 100$ kPa. In addition the mass flow rate of the steam is 2.6×10^5 kg/h.

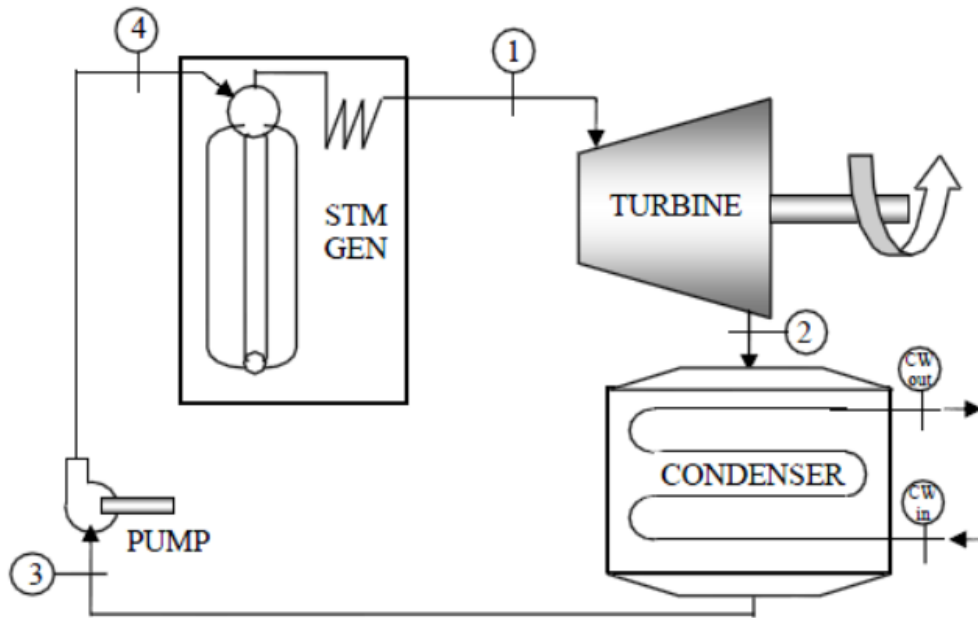


Figure 1: Cycle components

Determine:

- the *net rate of energy* increase of the steam passing through the steam generator.
- the *net rate exergy* increase of the steam passing through the steam generator.
- the rate exergy destruction in the turbine.
- the required mass flow rate of the cooling water.
- the *net rate energy* exits the plant with the cooling water.
- the *net rate exergy* exits the plant with the cooling water.

Solution: Standard assumptions can be applied. Each component is steady-state and changes in kinetic and potential energies can be neglected. Turbomachinery can be assumed adiabatic; and pressure drops in the heat exchangers can be neglected.