

Problem Statement: Water enters a turbine operating at steady state. At the inlet, the pressure and temperature are 8 MPa and 560 °C. At the exit, the pressure is 50 kPa, and the water is saturated vapor. The power output is 2 MW, and the mass flow rate is 2 kg/s. Heat transfer occurs with the surroundings with an average temperature of 27 °C. Potential and kinetic energy effects are negligible. Determine the heat transfer and the entropy rate production.