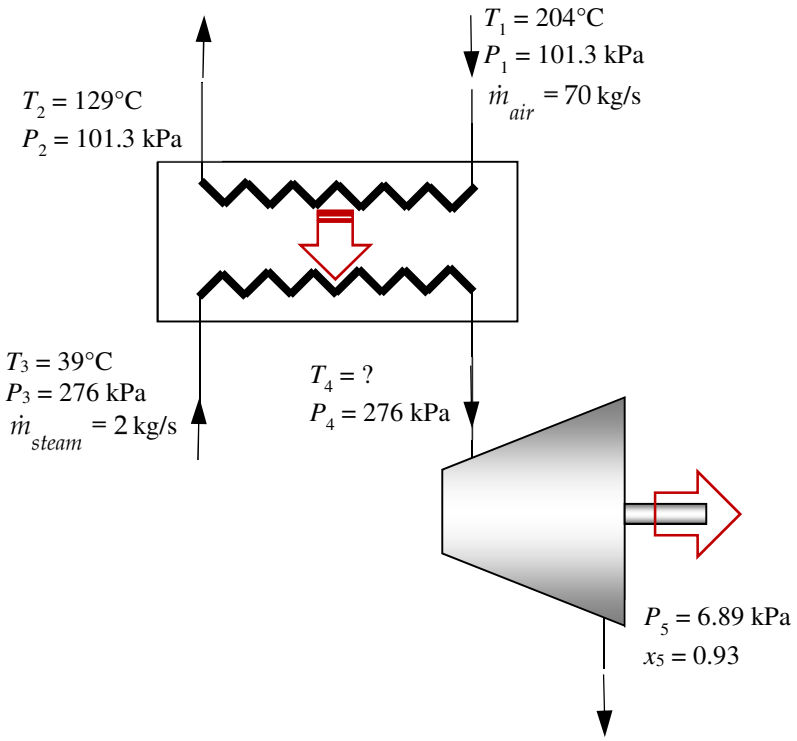
EXAMPLE: More exergetic efficiencies

Reconsider the waste heat recovery system from a previous example. The heat exchanger takes hot combustion gases and uses them to heat steam, which in turn passes through a turbine. The gases can be modeled as air treated as an ideal gas with variable specific heats. The surroundings are at T_0 = 25°C and T_0 = 25°C and P_0 = 101 kPa.



Based on your previous results,

(a) find the exergetic efficiency of the turbine, ε_T.
(b) How does the answer to part (a) compare to η_T? Explain?
(c) find the exergetic efficiency of the heat exchanger, ε_{HXR}.
(d) find the exergetic efficiency of the entire waster heat recovery system, ε.
(e) Does $\varepsilon = \varepsilon_{HXR} \cdot \varepsilon_T$? Explain.