The $T$-$s$ diagram for a vapor compression heat pump is shown below. Extract $s$ data from it and **estimate the specific entropy generation for the adiabatic throttle and compressor**.

[A little foresight when estimating $T_1$, $T_2$ and $T_3$ will be very beneficial. You will want enthalpies for all four states in a minute, so you ought to choose your temperatures so that the corresponding saturation pressures are even numbers and included in the R134a saturation tables.]

**Use the corresponding enthalpies, $h_1$, $h_2$, $h_3$ and $h_4$, compute the heat pump coefficient of performance.**