

Required power input

Refrigerant-134a enters the compressor of a refrigerator as a saturated vapor at 0.12 MPa (point 1) and leaves as a superheated vapor with $T = 50^\circ\text{C}$ at 0.9 MPa (point 2). It is then isobarically cooled in the condenser to a saturated liquid state (point 3) and finally an expansion valve reduces the pressure to 0.12 MPa (point 4). The next few questions will be about this cycle, so it might be convenient to make a table with all the information.

How much power input does this cooling cycle require (in kJ/kg)?

The power input is the difference between h_1 and h_2 . For point 1 the enthalpy is easy to look up, table 12 gives $h_1 = 236.99 \text{ kJ/kg}$.

For point 2 you can simply look in table 13, $h_2 = 284.79$.

$$h_2 - h_1 = 284.79 - 236.99 = 47.8 \text{ kJ/kg}$$