Chapter 2.3b

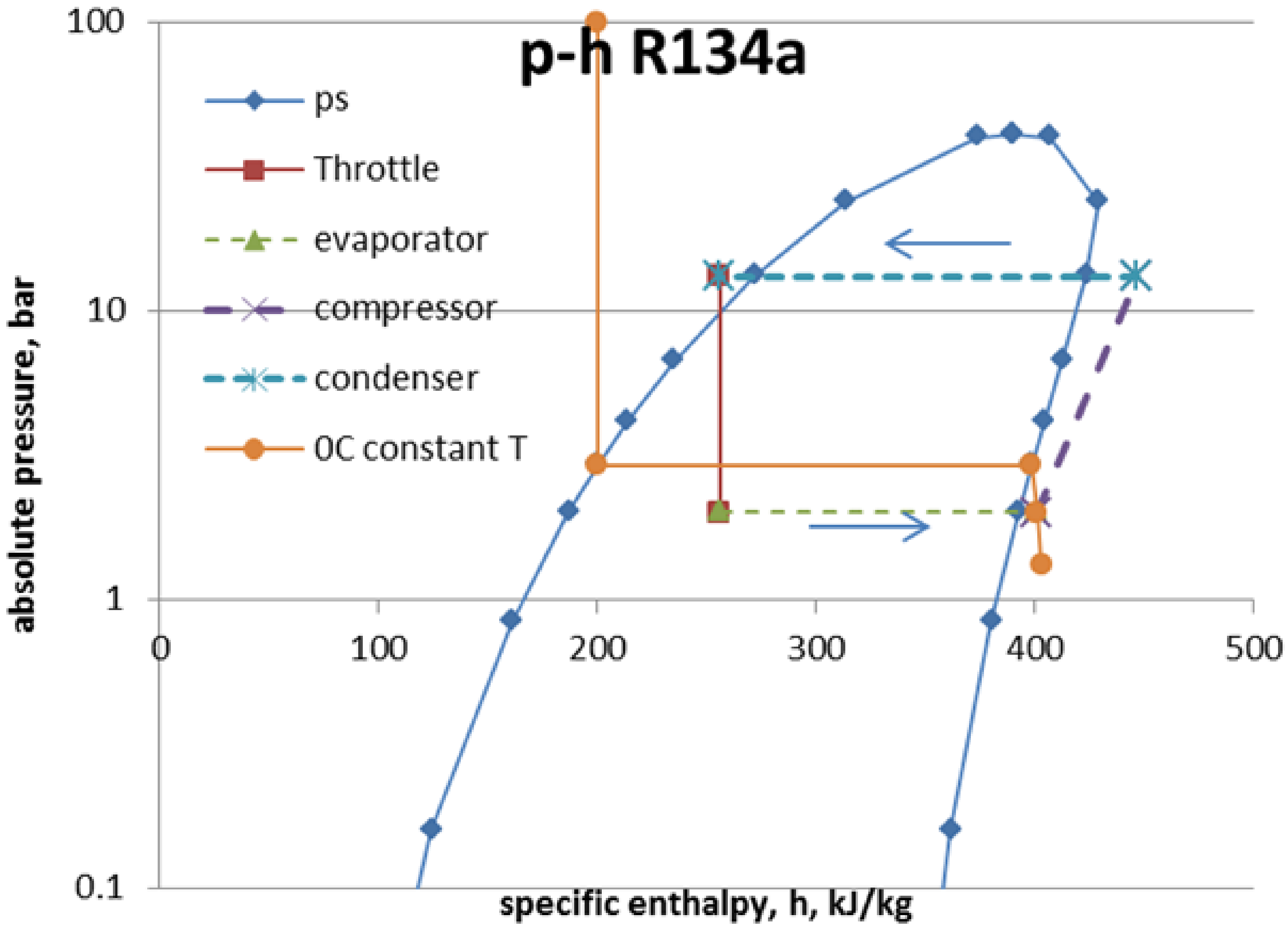
Refrigeration data, chart and calculations

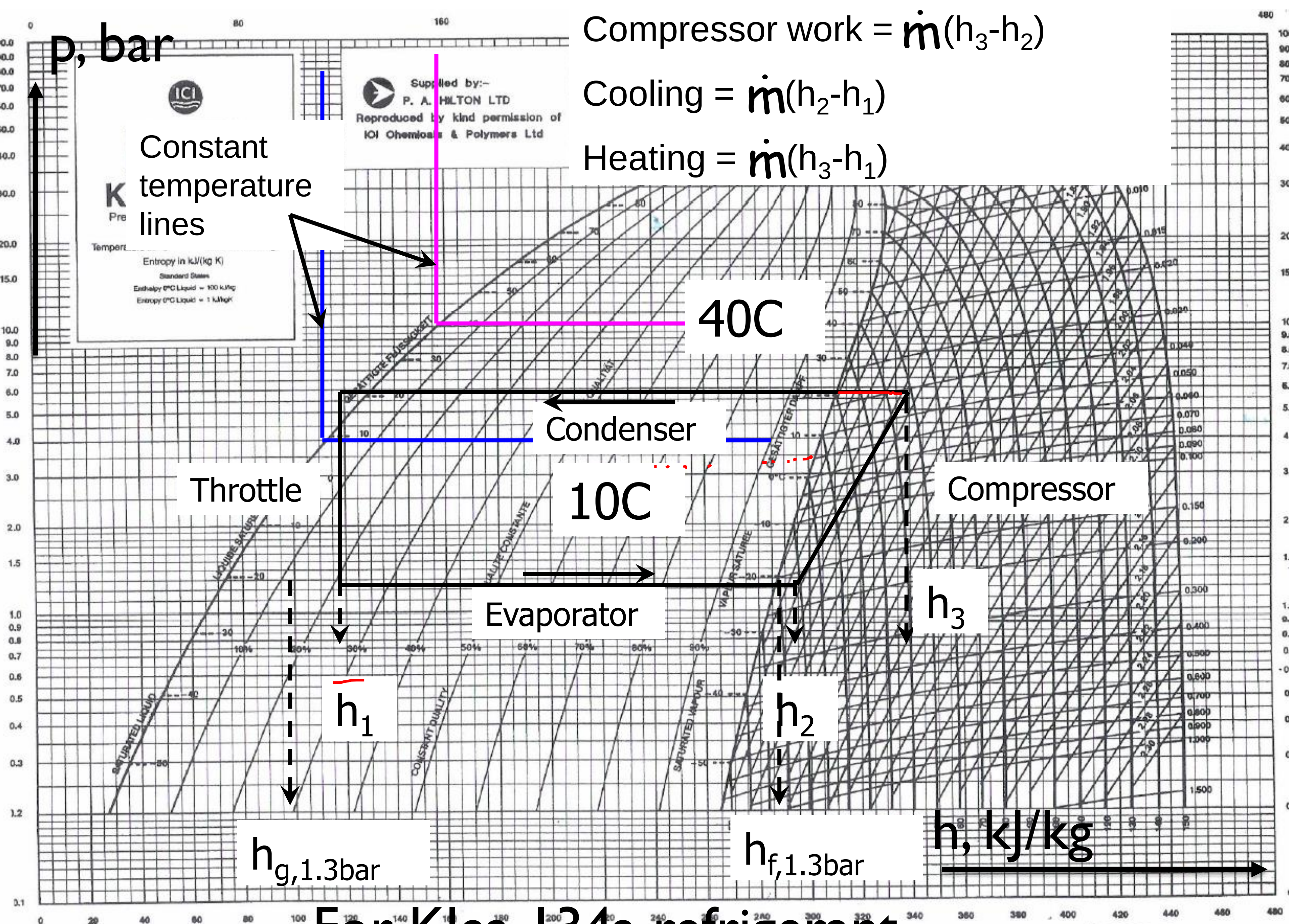
p-h chart – best for heat pumps

- This chart yields changes in enthalpy
- Enthalpy changes show work and heat applied in the different components of the heat pump
- We could use the tables and interpolation, but the chart is quicker

Refrigerant R134a p-h diagram

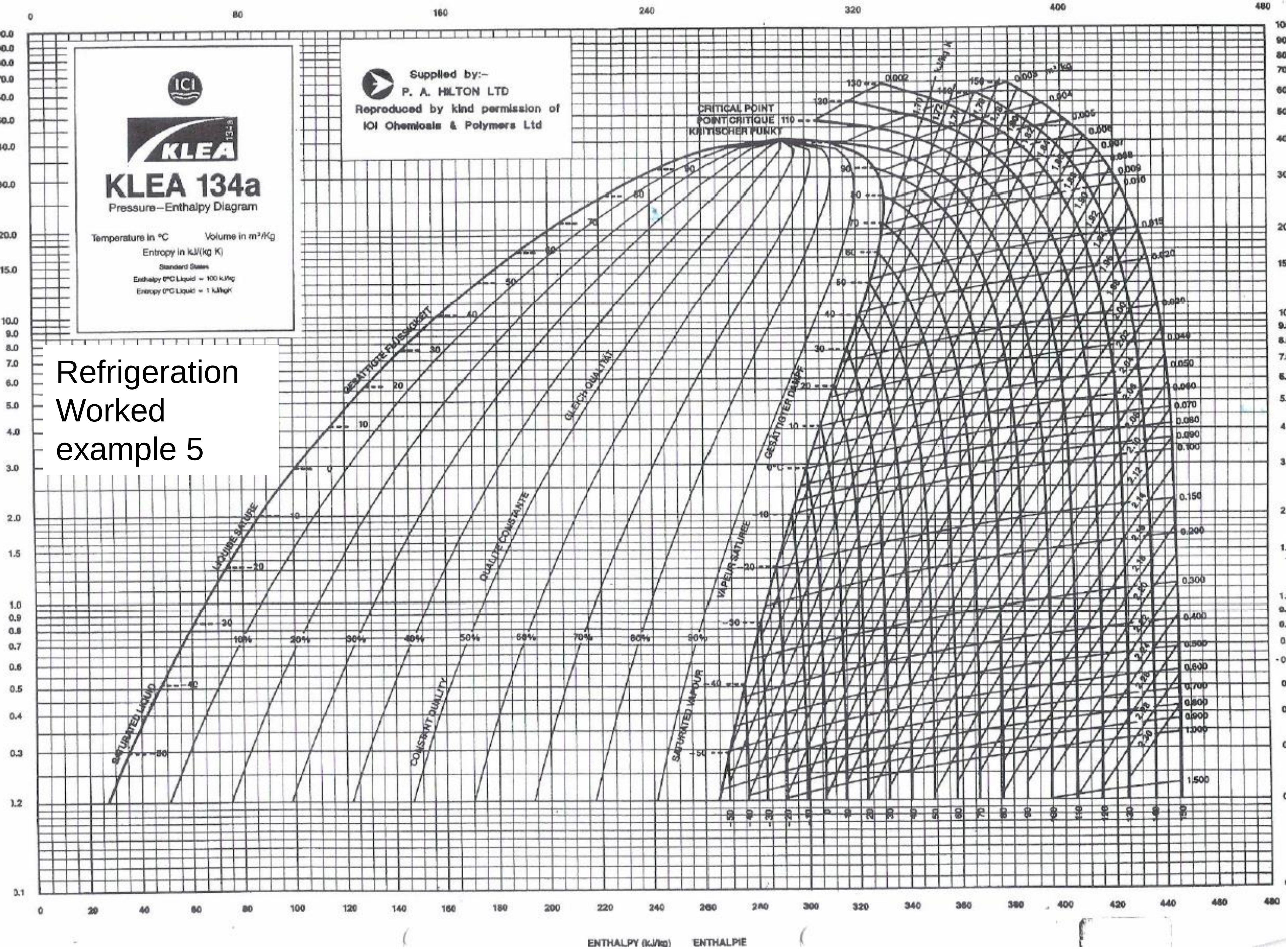
Notice: constant temperature profile – vertical in liquid region, horizontal in mixture and sharp descent in superheat – only shown for 0°C here. Refrigeration cycle – clearly enthalpy is obtainable in all the components





For Klea 134a refrigerant

Refrigeration Worked example 5



Coefficient of Performance, CoP
-reminder-

Don't want to use efficiency for how good a heat pump or refrigerator is because it's >1

CoP is the factor by which heat transfer is greater than work.

- Formula:
- $CoP_{heat\,pump} = \frac{\dot{Q}_{condenser}}{\dot{W}_{compressor}}$
- $CoP_{refrigerator} = \frac{\dot{Q}_{evaporator}}{\dot{W}_{compressor}}$