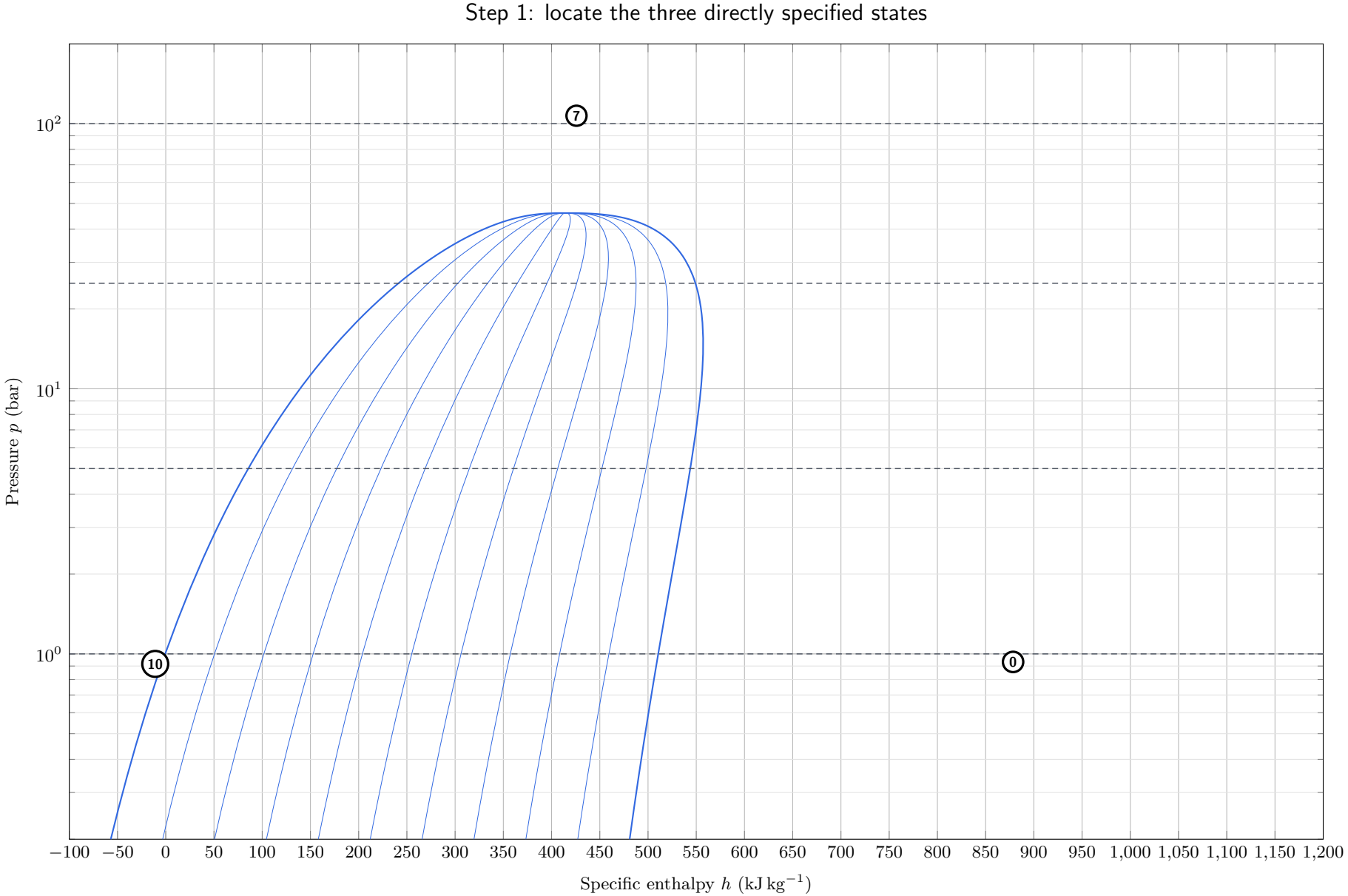
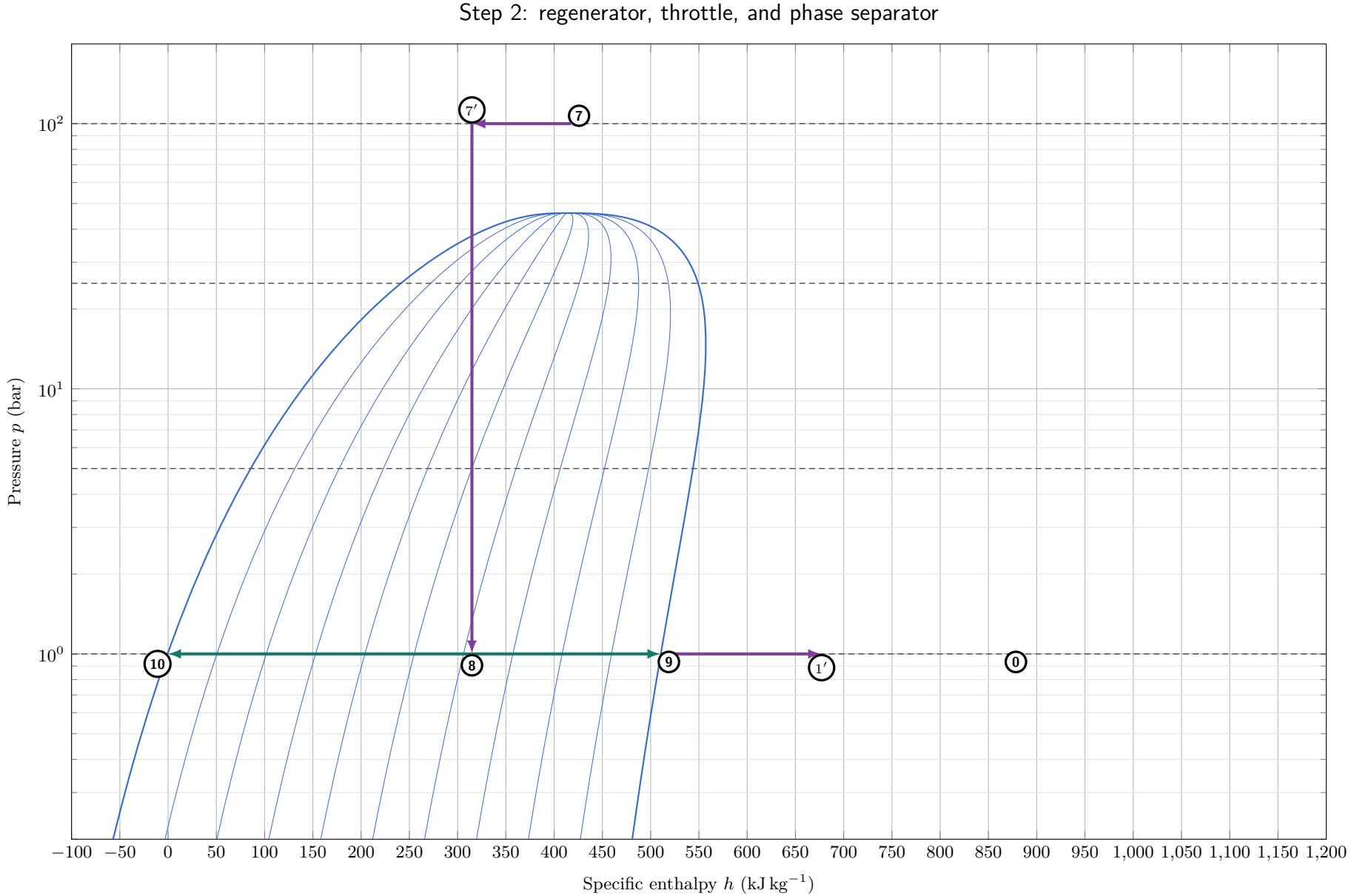
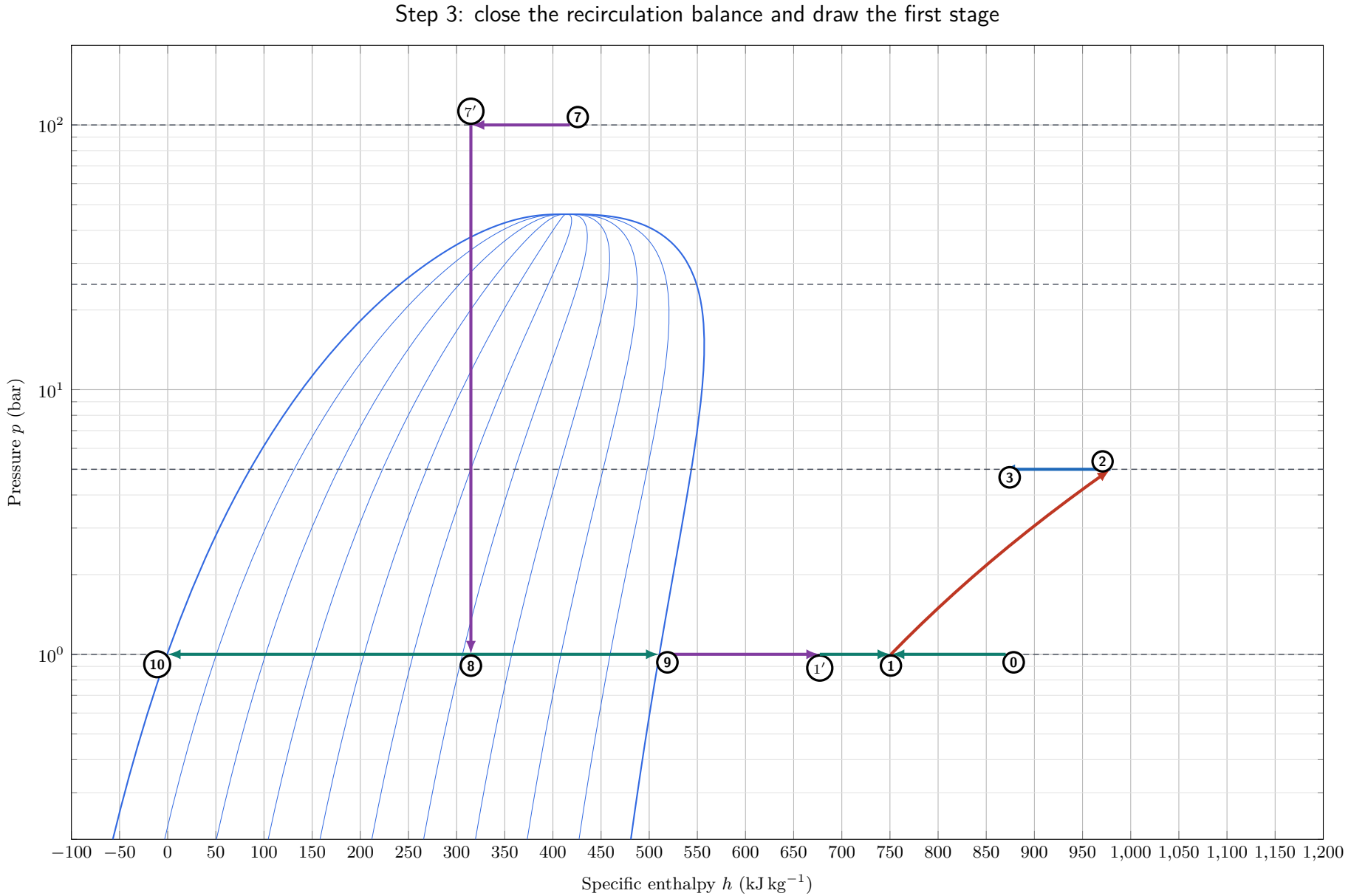
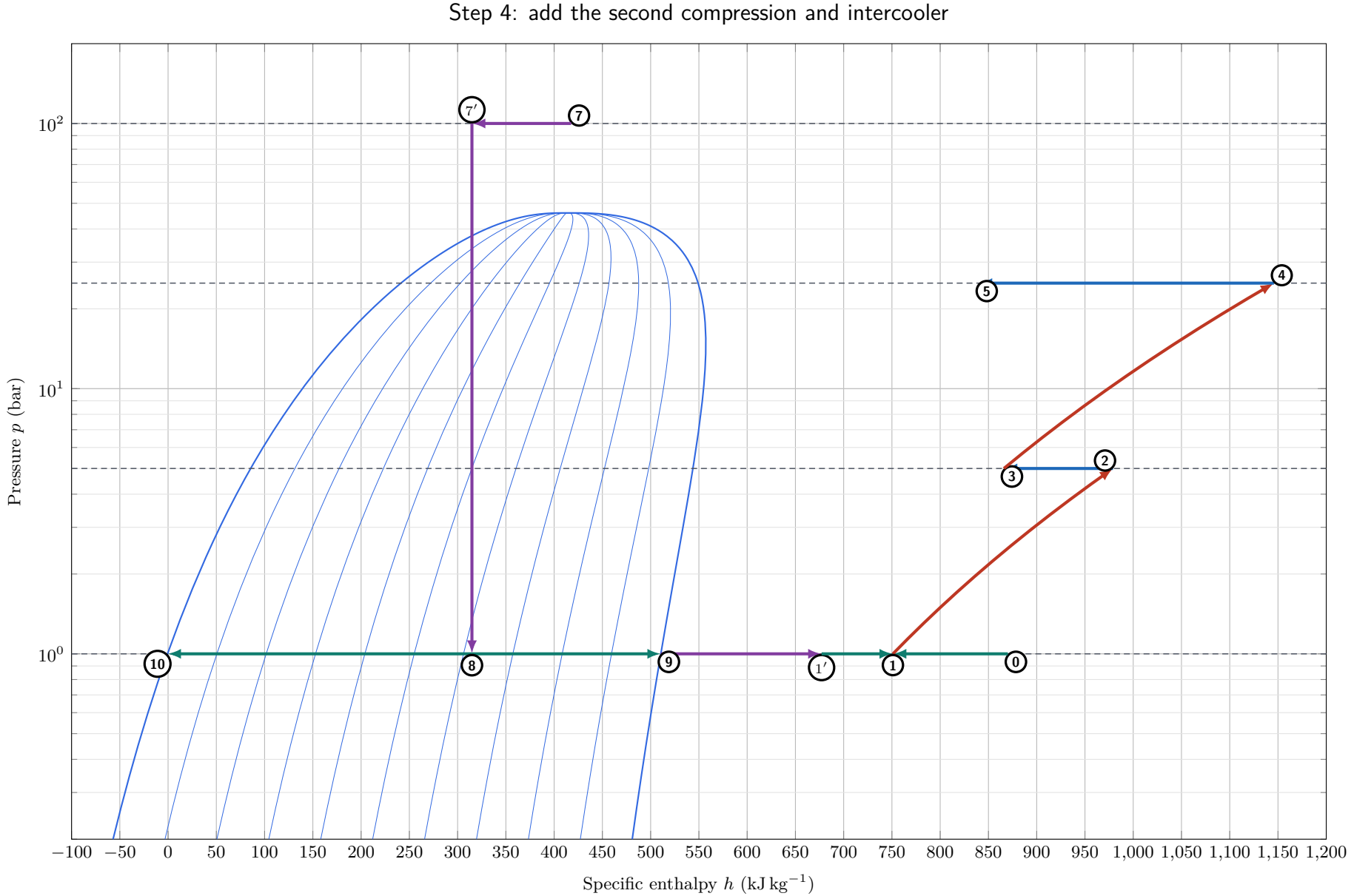
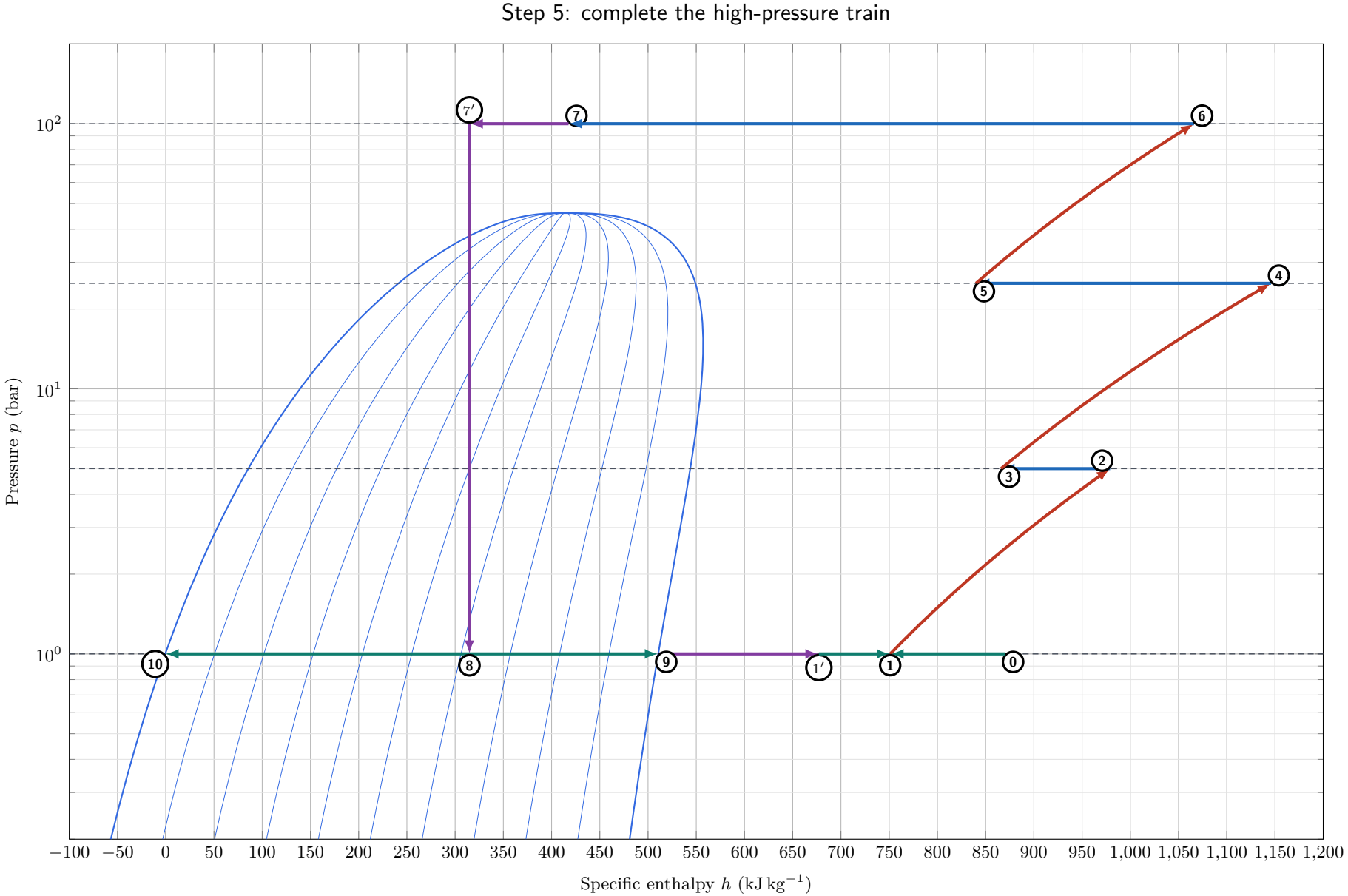
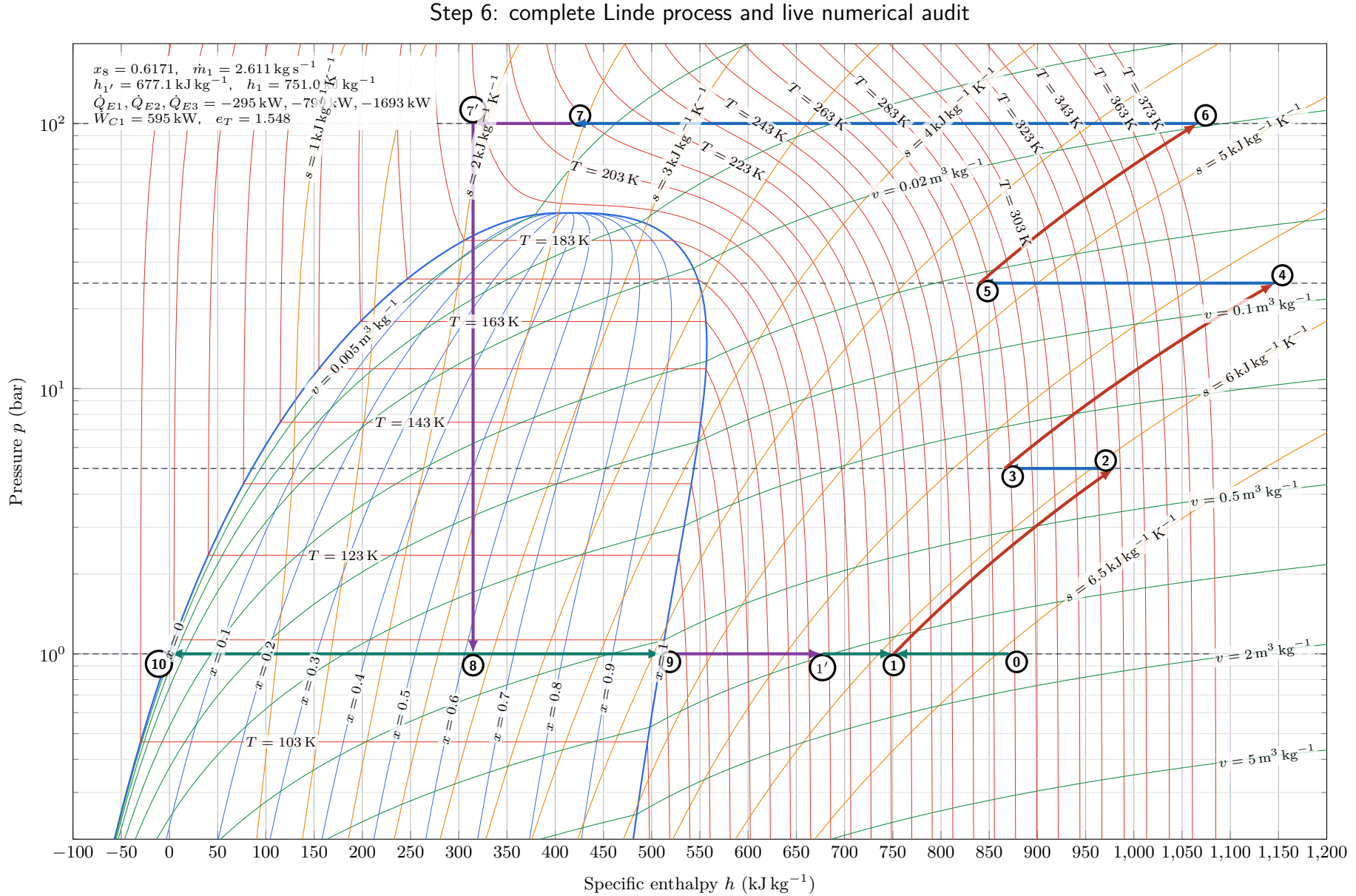

Step 1: locate the three directly specified states
7
10
0
10^2
10^1
10^0
Pressure p (bar)
−100 −50 0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1,000 1,050 1,100 1,150 1,200
Specific enthalpy h (kJ kg^{-1})


Step 2: regenerator, throttle, and phase separator
10^2
10^1
10^0
Pressure p (bar)
$7'$
7
10
8
9
$1'$
0
−100 −50 0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1,000 1,050 1,100 1,150 1,200
Specific enthalpy h (kJ kg^{-1})


Step 3: close the recirculation balance and draw the first stage
Pressure p (bar)
10^2
10^1
10^0
Specific enthalpy h (kJ kg^{-1})
−100 −50 0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1,000 1,050 1,100 1,150 1,200
7′
7
3
2
10
8
9
1′
1
0


Step 4: add the second compression and intercooler
Pressure p (bar)
10^2
10^1
10^0
Specific enthalpy h (kJ kg^{-1})
−100 −50 0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1,000 1,050 1,100 1,150 1,200
7′
7
5
4
3
2
10
8
9
1′
1
0


Step 5: complete the high-pressure train
10^2
10^1
10^0
Pressure p (bar)
$7'$
7
6
5
4
3
2
10
8
9
$1'$
1
0
−100 −50 0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1,000 1,050 1,100 1,150 1,200
Specific enthalpy h (kJ kg^{-1})


Step 6: complete Linde process and live numerical audit
$x_8 = 0.6171$, $\dot{m}_1 = 2.611\,\mathrm{kg\,s^{-1}}$
$h_{1'} = 677.1\,\mathrm{kJ\,kg^{-1}}$, $h_1 = 751.0\,\mathrm{kJ\,kg^{-1}}$
$\dot{Q}_{E1}, \dot{Q}_{E2}, \dot{Q}_{E3} = -295\,\mathrm{kW}, -79[illegible]\,\mathrm{kW}, -1693\,\mathrm{kW}$
$\dot{W}_{C1} = 595\,\mathrm{kW}$, $e_T = 1.548$
Pressure p (bar)
Specific enthalpy h ($\mathrm{kJ\,kg^{-1}}$)
10^2
10^1
10^0
−100 −50 0 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950 1,000 1,050 1,100 1,150 1,200
$T = 103\,\mathrm{K}$
$T = 123\,\mathrm{K}$
$T = 143\,\mathrm{K}$
$T = 163\,\mathrm{K}$
$T = 183\,\mathrm{K}$
$T = 203\,\mathrm{K}$
$T = 223\,\mathrm{K}$
$T = 243\,\mathrm{K}$
$T = 263\,\mathrm{K}$
$T = 283\,\mathrm{K}$
$T = 303\,\mathrm{K}$
$T = 323\,\mathrm{K}$
$T = 343\,\mathrm{K}$
$T = 363\,\mathrm{K}$
$T = 373\,\mathrm{K}$
$x = 0$
$x = 0.1$
$x = 0.2$
$x = 0.3$
$x = 0.4$
$x = 0.5$
$x = 0.6$
$x = 0.7$
$x = 0.8$
$x = 0.9$
$x = 1$
$v = 0.005\,\mathrm{m^3\,kg^{-1}}$
$v = 0.02\,\mathrm{m^3\,kg^{-1}}$
$v = 0.1\,\mathrm{m^3\,kg^{-1}}$
$v = 0.5\,\mathrm{m^3\,kg^{-1}}$
$v = 2\,\mathrm{m^3\,kg^{-1}}$
$v = 5\,\mathrm{m^3\,kg^{-1}}$
$s = 1\,\mathrm{kJ\,kg^{-1}\,K^{-1}}$
$s = 2\,\mathrm{kJ\,kg^{-1}\,K^{-1}}$
$s = 3\,\mathrm{kJ\,kg^{-1}\,K^{-1}}$
$s = 4\,\mathrm{kJ\,kg^{-1}\,K^{-1}}$
$s = 5\,\mathrm{kJ\,kg^{-1}\,K^{-1}}$
$s = 6\,\mathrm{kJ\,kg^{-1}\,K^{-1}}$
$s = 6.5\,\mathrm{kJ\,kg^{-1}\,K^{-1}}$
0
1
1′
2
3
4
5
6
7
7′
8
9
10