

Ponchon – Savarit problem

0.3 kg/s of saturated liquid containing 44 % w/w water and 56 % w/w acetic acid is to be fractionated to give distillate containing 90 % w/w water and bottoms containing 20% w/w water. The reflux ratio is 5 and the reflux is returned as saturated liquid. The enthalpies of saturated liquid and vapour , h and H in Joules/gm are given by :

$$h = 250 + 170 x$$

$$H = 670 + 2010 y$$

where x and y are weight fractions of water in liquid and vapour respectively. Equilibrium data in wt % water is:

Liquid	9	20	30	44	58	72	86
Vapour	14	30	42	56	68	79	90

Calculate:

- a- Number of theoretical stages in rectifying and stripping sections.
- b- Product flow rates
- c- Flow of water in overhead condenser assuming a temperature rise of 20 K for water
- d- Flow of saturated steam at 3 bar pressure required for the reboiler.



