REFRIGERATION AND CRYOGENICS – exercises , year III
List IV

Example 1:
Compressed nitrogen have following initial temperature and pressure: T_1= 300K, p_1= 150 bar. Determinate a temperature drop after isenthalpic expansion to environment pressure. Determinate the initial temperature T_1 for which after isenthalpic expansion process to environment pressure nitrogen reach two phase state with 0.8 vapor quality.

Example 2:
Determinate a initial pressure of :

a: nitrogen
b: helium
c: air,

to isenthropic expansion with external work process resulted in 100 K temperature drop. Initial temperature of particular gases is 300 K. Solve a problem analytically and graphically.

Example 3:
In system there is:

a: nitrogen
b: helium
c: air,

with initial temperature 290 K and pressure 3 bar. In system isenthropic expansion or free expansion process to environment pressure could be realized. Determinate which process will result in larger temperature drop.

Example 4:
Compare a final temperature of nitrogen, helium and air with initial parameters: p_1= 5 MPa i T_1= 300K after following expansion processes:

a: isenthalpic,
b: isentropic,
c: free

Final pressure is equal to environment pressure.