"ME-5427 Introduction to Turbomachinery"
"Zhaoyi Jiang(.1364)"

"HW1 P5"

"Inlet"
p01=2.5[bar]
t01=500[k]
h01=enthalpy(air,t=t01)
s01=entropy(air,p=p01,t=t01)
s01=s1

"Exit"
p2=1.5[bar]
s1=s2
h02=h01
h2=enthalpy(air,s=s2,p=p2)
v2=(2*(h02-h2)*convert(kj,j))^(0.5)
t2=temperature(air,h=h2)

"Speed"
M=v2/soundspeed(air,t=t2)
"Subsonic"

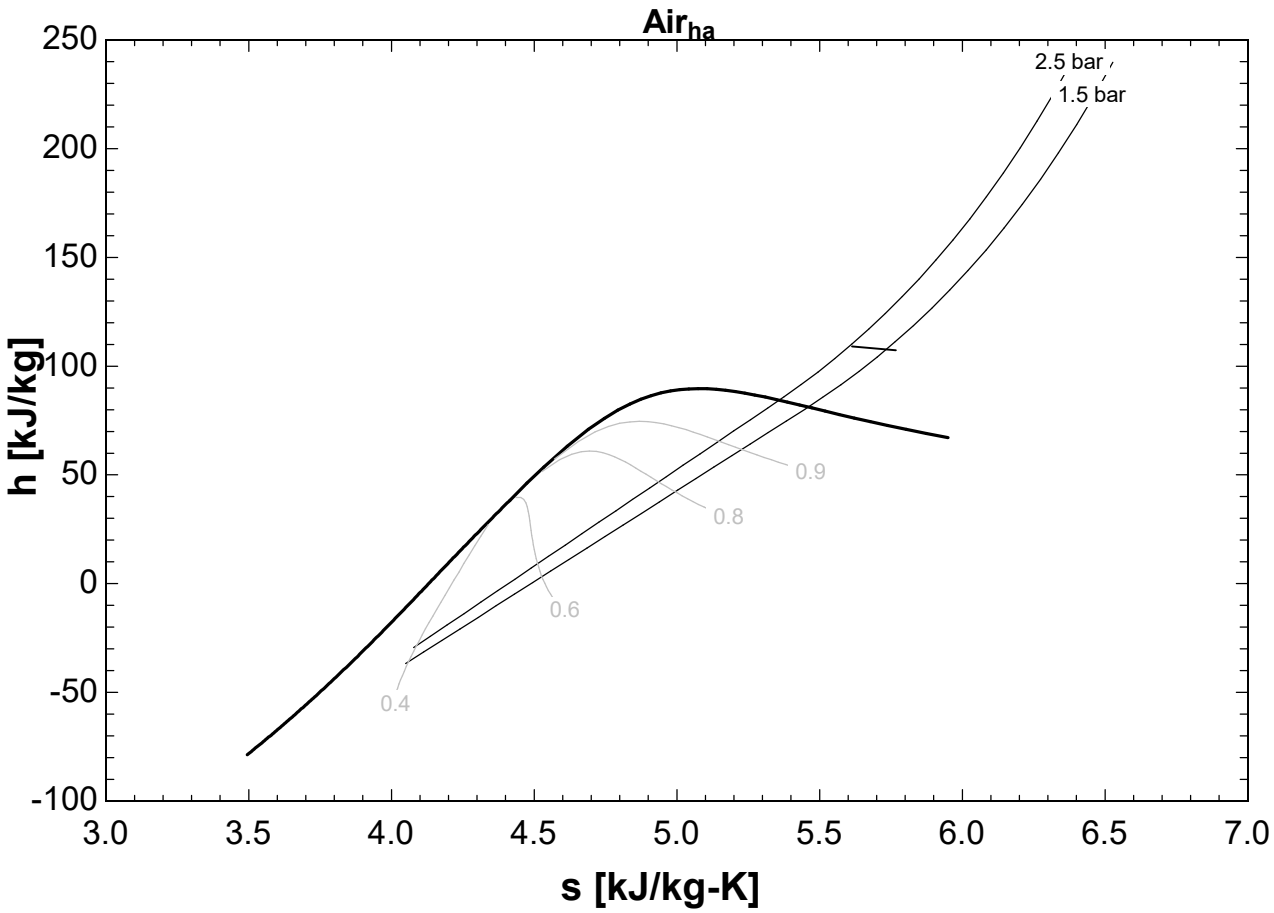
"M dot"
omega=15*convert(cm^2,m^2)
rho=density(air,p=p2,t=t2)
m_dot=omega*rho*v2

SOLUTION

Unit Settings: SI K bar kJ mass deg

h01 = 503.4 [kj/kg]	h02 = 503.4 [kj/kg]	h2 = 434.9 [kj/kg]
M = 0.889	$\dot{m}$ = 0.6695 [kg/s]	ω = 0.0015 [m^2]
p01 = 2.5 [bar]	p2 = 1.5 [bar]	ρ = 1.206 [kg/m^3]
s01 = 5.96 [kj/kg-k]	s1 = 5.96 [kj/kg-k]	s2 = 5.96 [kj/kg-k]
t01 = 500 [K]	t2 = 433.1 [k]	v2 = 369.9 [m/s]

No unit problems were detected.


Air$_{ha}$
2.5 bar
1.5 bar
0.9
0.8
0.6
0.4
h [kJ/kg]
s [kJ/kg-K]
250
200
150
100
50
0
-50
-100
3.0
3.5
4.0
4.5
5.0
5.5
6.0
6.5
7.0