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"Scenario 15 - perfect insulation pressure rise then constant volume"

F$ = 'Steam_IAPWS'                                  "water"

"case A subcooled liquid - little change "
"case B two phase - both T and v change when pressure rises, not sure how to obtain work"
"Ignore cases A and B"

T[1] = 125[c]                                       "initial temperature inside and outside"
vol[1] = 1e-3[m3]                                   "1 liter volume"
vol[2]=0.5e-3[m3]                                   "0.5 liter volume after pressure rised"
k=1.27[-]                                           "average Isentropic Exponent"

A_P = pi*dia^2/4                                    "cross sectional area of the piston"
m2 = 100[kg]                                        "added mass"
dia = 0.1[m]                                        "piston diameter"
//delta_P = m2*g#/A_P*convert(Pa, kPa)              "added pressure from mass m2"

"Case C - superheated vapor"
 "state 1C"
TC[1]=T[1]                                          "temperature at state 1"
PC[1] = 101.325[kPa]                                "pressure at state 1"
vC[1] = volume(F$, T=TC[1], P=PC[1])                "specific volume at state 1"
hC[1] = enthalpy(F$, T=TC[1], P=PC[1])              "specific enthalpy at state 1"
uC[1] = intenergy(F$, T=TC[1], P=PC[1])             "specific internal energy at state 1"
sC[1] = entropy(F$, T=TC[1], P=PC[1])               "specific entropy at state 1"
mass_C = vol[1]/vC[1]                               "mass of H2O"

"state 2C"
vC[2] = vol[2]/mass_C                               "specific volume at state 2"
//guess TC[2] to obtain PC[2] and uC[2], usinguC[2] - uC[1]=-(PC[2]*vC[2]-PC[1]*vC[1])/(1-k)  to check
PC[2] = pressure(F$, T=TC[2], v=vC[2])              "pressure at state 2"
uC[2] = intenergy(F$, T=TC[2], v=vC[2])             "specific internal energy at state 2"
uC[2] - uC[1]=-(PC[2]*vC[2]-PC[1]*vC[1])/(1-k)      "determine heat transfer from 1st law"

hC[2] = enthalpy(F$, T=TC[2],v=vC[2])               "specific enthalpy at state 2"
sC[2] = entropy(F$, T=TC[2], v=vC[2])               "specific entropy at state 2"

"state 3C"
vC[3]=vC[2]                                         "constant volume"
//Q_23=-1[kW]                                       "rate of removing heat"
PC[3]=3[kPa]                                        "final pressure at state 3"
TC[3]=temperature(F$, v=vC[3], P=PC[3])             "temperature at state 3"
hC[3] = enthalpy(F$, T=TC[3], v=vC[3])              "specific enthalpy at state 3"
uC[3] = intenergy(F$, T=TC[3], v=vC[3])             "specific internal energy at state 3"
sC[3] = entropy(F$, T=TC[3], v=vC[3])               "specific entropy at state 3"
//Q_23*time23C/mass_C = (uC[3] - uC[2])             "1st law at constant volume, no work"
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SOLUTION

Unit Settings: SI C kPa kJ mass deg

A_P = 0.007854 [m^2]	dia = 0.1 [m]
F$ = 'steam_iapws'	k = 1.27 [-]
m2 = 100 [kg]	$mass_C$ = 0.0005577 [kg]

No unit problems were detected.

Arrays Table: Main

	vol_i [m3]	T_i [C]	PC_i [kPa]	TC_i [C]	hC_i [kJ/kg]	sC_i [kJ/kg-K]	uC_i [kJ/kg]	vC_i [m3/kg]
1	0.001	125	101.3	125	2727	7.487	2545	1.793
2	0.0005		200.4	125.2	2717	7.153	2537	0.8966
3			3	24.08	148.9	0.5156	146.2	0.8966

Parametric Table: Case C23

	PC_3 [kPa]	vC_3 [m3/kg]	TC_3 [C]
Run 1	202.8	*0.8966*	*129.6*
Run 2	180.6	*0.8966*	*117*
Run 3	158.4	*0.8966*	*113*
Run 4	136.2	*0.8966*	*108.5*
Run 5	114	*0.8966*	*103.3*
Run 6	91.8	*0.8966*	*97.23*
Run 7	69.6	*0.8966*	*89.78*
Run 8	47.4	*0.8966*	*79.99*
Run 9	25.2	*0.8966*	*65.14*
Run 10	3	*0.8966*	*24.08*