

"Scenario 6 - Some insulation Pressure rise"**"case A subcooled liquid - there is little change of T and v when pressure rises"****"case B two phase - both T and v change when pressure rises, not sure how to obtain work"**

F\$ = 'Steam_IAPWS'

"water"

dia = 0.1[m]

"piston diameter"

A_P = pi*dia^2/4

"cross sectional area of the piston"

m2 = 100[kg]

"added mass"

//delta_P = m2*g#/A_P*convert(Pa, kPa)

"added pressure from mass m2"

Q_12C=-0.001[kW]

"heat transfer from the vessel to the surrounding"

time=0.1[s]

"time after the pressure rises"

n=1.2[-]

"polytropic exponent"

"Initial state - case C superheated vapor"

PC[1] = 1[kPa]

"pressure at state 1"

TC[1] = 150[C]

"temperature at state 1"

vol[1] = 1e-3[m3]

"1 liter volume"

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"

"initial conditions chosen so that final state will still be in the superheated regime"

PC[2] = PC[1] + delta_P

"final pressure"

uC[2] = uC[1]+Q_12C*time/mass_C- PC[1]*vC[1]^n/(n-1)*(vC[1]^(1-n)-vC[2]^(1-n)) **"determine final intenal energy from 1st law"**TC[2] = **temperature**(F\$, u=uC[2], P=PC[2])

"final temperature"

vC[2] = **volume**(F\$, u=uC[2], P=PC[2])

"specific volume at state 2"

hC[2] = **enthalpy**(F\$, u=uC[2], P=PC[2])

"specific enthalpy at state 2"

sC[2] = **entropy**(F\$, u=uC[2], P=PC[2])

"specific entropy at state 2"

Arrays Table: Main

	vol _i	PC _i	hC _i	sC _i	uC _i	vC _i	TC _i
	[m ³]	[kPa]	[kJ/kg]	[kJ/kg-K]	[kJ/kg]	[m ³ /kg]	[C]
1	0.001	1	2784	9.753	2588	195.3	150
2		126	4222	9.518	3715	4.026	826.3

Parametric Table: Case C

	δ _p	TC ₂	vC ₂	PC ₂
	[kPa]	[C]	[m ³ /kg]	[kPa]
Run 1	1.25	227.7	102.7	2.25
Run 2	2.5	279.8	72.91	3.5
Run 3	3.75	317.7	57.4	4.75
Run 4	5	347.7	47.75	6
Run 5	6.25	372.7	41.11	7.25
Run 6	7.5	394.2	36.23	8.5
Run 7	8.75	413	32.48	9.75
Run 8	10	429.9	29.49	11
Run 9	11.25	445.1	27.06	12.25
Run 10	12.5	459	25.03	13.5
Run 11	13.75	471.9	23.31	14.75
Run 12	15	483.8	21.83	16
Run 13	16.25	494.9	20.55	17.25

Parametric Table: Case C

	δp [kPa]	TC_2 [C]	VC_2 [m ³ /kg]	PC_2 [kPa]
Run 14	17.5	505.3	19.42	18.5
Run 15	18.75	515.1	18.42	19.75
Run 16	20	524.4	17.53	21
Run 17	21.25	533.2	16.72	22.25
Run 18	22.5	541.6	16	23.5
Run 19	23.75	549.6	15.34	24.75
Run 20	25	557.3	14.74	26
Run 21	26.25	564.6	14.19	27.25
Run 22	27.5	571.6	13.68	28.5
Run 23	28.75	578.4	13.21	29.75
Run 24	30	584.9	12.77	31
Run 25	31.25	591.2	12.37	32.25
Run 26	32.5	597.3	11.99	33.5
Run 27	33.75	603.2	11.64	34.75
Run 28	35	608.9	11.31	36
Run 29	36.25	614.4	11	37.25
Run 30	37.5	619.8	10.7	38.5
Run 31	38.75	625	10.43	39.75
Run 32	40	630.1	10.17	41
Run 33	41.25	635	9.919	42.25
Run 34	42.5	639.8	9.685	43.5
Run 35	43.75	644.5	9.462	44.75
Run 36	45	649.1	9.251	46
Run 37	46.25	653.5	9.05	47.25
Run 38	47.5	657.9	8.858	48.5
Run 39	48.75	662.1	8.675	49.75
Run 40	50	666.3	8.5	51
Run 41	51.25	670.4	8.333	52.25
Run 42	52.5	674.4	8.172	53.5
Run 43	53.75	678.3	8.019	54.75
Run 44	55	682.1	7.871	56
Run 45	56.25	685.9	7.73	57.25
Run 46	57.5	689.6	7.594	58.5
Run 47	58.75	693.2	7.463	59.75
Run 48	60	696.7	7.337	61
Run 49	61.25	700.2	7.215	62.25
Run 50	62.5	703.6	7.098	63.5
Run 51	63.75	707	6.985	64.75
Run 52	65	710.3	6.876	66
Run 53	66.25	713.5	6.77	67.25
Run 54	67.5	716.7	6.668	68.5
Run 55	68.75	719.9	6.569	69.75
Run 56	70	723	6.474	71
Run 57	71.25	726	6.381	72.25
Run 58	72.5	729	6.292	73.5
Run 59	73.75	732	6.205	74.75
Run 60	75	734.9	6.12	76
Run 61	76.25	737.8	6.038	77.25
Run 62	77.5	740.6	5.959	78.5
Run 63	78.75	743.4	5.882	79.75
Run 64	80	746.1	5.806	81
Run 65	81.25	748.8	5.733	82.25
Run 66	82.5	751.5	5.662	83.5
Run 67	83.75	754.2	5.593	84.75
Run 68	85	756.8	5.526	86

Parametric Table: Case C

	δ_p [kPa]	TC_2 [C]	VC_2 [m3/kg]	PC_2 [kPa]
Run 69	86.25	759.3	5.46	87.25
Run 70	87.5	761.9	5.397	88.5
Run 71	88.75	764.4	5.334	89.75
Run 72	90	766.9	5.274	91
Run 73	91.25	769.3	5.214	92.25
Run 74	92.5	771.7	5.157	93.5
Run 75	93.75	774.1	5.1	94.75
Run 76	95	776.5	5.045	96
Run 77	96.25	778.8	4.991	97.25
Run 78	97.5	781.1	4.939	98.5
Run 79	98.75	783.4	4.887	99.75
Run 80	100	785.7	4.837	101
Run 81	101.3	787.9	4.788	102.3
Run 82	102.5	790.1	4.74	103.5
Run 83	103.8	792.3	4.693	104.8
Run 84	105	794.5	4.647	106
Run 85	106.3	796.6	4.602	107.3
Run 86	107.5	798.7	4.558	108.5
Run 87	108.8	800.8	4.515	109.8
Run 88	110	802.9	4.473	111
Run 89	111.3	804.9	4.432	112.3
Run 90	112.5	807	4.391	113.5
Run 91	113.8	809	4.351	114.8
Run 92	115	811	4.312	116
Run 93	116.3	812.9	4.274	117.3
Run 94	117.5	814.9	4.237	118.5
Run 95	118.8	816.8	4.2	119.8
Run 96	120	818.8	4.164	121
Run 97	121.3	820.7	4.129	122.3
Run 98	122.5	822.5	4.094	123.5
Run 99	123.8	824.4	4.06	124.8
Run 100	125	826.3	4.026	126



