"Thermo-simulator scenarios - close system, piston-cylinder"

F$ = 'steam_IAPWS'

"1. constant pressure heat addition"

T[1] = 25[c] "room temperature"
P_sat1 =**p_sat**(F$,***T***=T[1]) "saturation pressure at room temperature"
mass = 1[kg] "nominal mass of fluid"

"1a - start in subcooled liquid region"

P[1] = 1.5*P_sat1 "elevated pressure - subcooled liquid"
v[1] = **volume**(F$, T = T[1], P=P[1]) "specific volume at state 1"
u[1] = **intenergy**(F$, ***T***=T[1], ***P***=P[1]) "specific internal energy at state 1"
h[1] = **enthalpy**(F$, ***T***=T[1], ***P***=P[1]) "specific enthalpy at state 1"
s[1] = **entropy**(F$, ***T***=T[1], ***P***=P[1]) "specific entropy at state 1"
vf[1] = **volume**(F$, ***P***=P[1], ***x***=0) "specific volume of saturated liquid at pressure P[1]"
vg[1] = **volume**(F$, ***P***=P[1], ***x***=1) "specific volume of saturated vapor at pressure P[1]"
uf[1] = **intenergy**(F$, ***P***=P[1], ***x***=0) "specific internal energy of saturated liquid at P[1]"
ug[1] = **intenergy**(F$, ***P***=P[1], ***x***=1) "specific internal energy of saturated vapor at P[1]"

Q = 1000[w] "heating rate"
{time = 1/60 "time step"}

P[2] = P[1] "constant pressure process"
v[2] = **volume**(F$, u = u[2], P=P[2]) "specific volume at state 2"
u[2] = u[1] + Q*time/mass - P[2]*(v[2] - v[1])***convert**(kJ, J) "specific internal energy at state 2"
h[2] = **enthalpy**(F$, ***u***=u[2], ***P***=P[2]) "specific enthalpy at state 2"
s[2] = **entropy**(F$, ***u***=u[2], ***P***=P[2]) "specific entropy at state 2"
T[2] = **temperature**(F$, ***u***=u[2], ***P***=P[2]) "Temperature at state 2"

"1B - start in 2-phase region"

x[3] = 0.4 "quality at beginning state"
P[3] = P_sat1 "saturated pressure - 2 phase region"
v[3] = **volume**(F$, x= x[3], P=P[3]) "specific volume at state 3"
u[3] = **intenergy**(F$, ***x***=x[3], ***P***=P[3]) "specific internal energy at state 3"
h[3] = **enthalpy**(F$, ***x***=x[3], ***P***=P[3]) "specific enthalpy at state 3"
s[3] = **entropy**(F$, ***x***=x[3], ***P***=P[3]) "specific entropy at state 3"
vf[3] = **volume**(F$, ***P***=P[3], ***x***=0) "specific volume of saturated liquid at pressure P[3]"
vg[3] = **volume**(F$, ***P***=P[3], ***x***=1) "specific volume of saturated vapor at pressure P[3]"
uf[3] = **intenergy**(F$, ***P***=P[3], ***x***=0) "specific internal energy of saturated liquid at P[3]"
ug[3] = **intenergy**(F$, ***P***=P[3], ***x***=1) "specific internal energy of saturated vapor at P[3]"

P[4] = P[3] "constant pressure process"
v[4] = **volume**(F$, u = u[4], P=P[4]) "specific volume at state 4"
u[4] = u[3] + Q*time/mass - P[4]*(v[4] - v[3])***convert**(kJ, J) "specific internal energy at state 4"
h[4] = **enthalpy**(F$, ***u***=u[4], ***P***=P[4]) "specific enthalpy at state 4"
s[4] = **entropy**(F$, ***u***=u[4], ***P***=P[4]) "specific entropy at state 4"
T[4] = **temperature**(F$, ***u***=u[4], ***P***=P[4]) "Temperature at state 4"

"1C - start in the superheated vapor region"

T[5] = T[1] "ambient temperature"
P[5] = P_sat1/1.5 "pressure below the saturation pressure = superheated"
v[5] = **volume**(F$, ***T***=T[5], ***P***=P[5]) "specific volume at state 5"
u[5] = **intenergy**(F$, ***T***=T[5], ***P***=P[5]) "specific internal energy at state 5"

h[5] = **enthalpy**(F$, ***T***=T[5], ***P***=P[5]) "specific enthalpy at state 5"
s[5] = **entropy**(F$, ***T***=T[5], ***P***=P[5]) "specific entropy at state 5"
vf[5] = **volume**(F$, ***P***=P[5], ***x***=0) "specific volume of saturated liquid at pressure P[5]"
vg[5] = **volume**(F$, ***P***=P[5], ***x***=1) "specific volume of saturated vapor at pressure P[5]"
uf[5] = **intenergy**(F$, ***P***=P[5], ***x***=0) "specific internal energy of saturated liquid at P[5]"
ug[5] = **intenergy**(F$, ***P***=P[5], ***x***=1) "specific internal energy of saturated vapor at P[5]"

P[6] = P[5] "constant pressure process"
v[6] = **volume**(F$, u = u[6], P=P[6]) "specific volume at state 6"
u[6] = u[5] + Q*time/mass - P[5]*(v[6] - v[5])***convert**(kJ, J) "specific internal energy at state 6"
h[6] = **enthalpy**(F$, ***u***=u[6], ***P***=P[6]) "specific enthalpy at state 6"
s[6] = **entropy**(F$, ***u***=u[6], ***P***=P[6]) "specific entropy at state 6"
T[6] = **temperature**(F$, ***u***=u[6], ***P***=P[6]) "Temperature at state 6"

SOLUTION
Unit Settings: SI C kPa J mass deg
(1a, Run 129)
F$ = 'steam_iapws' mass = 1 [kg] P_{sat1} = 3.17 [kPa]
Q = 1000 [W] time = 3000 [s]

No unit problems were detected.

Arrays Table: Main

	T_i [C]	u_i [J/kg]	v_i [m3/kg]	h_i [J/kg]	P_i [kPa]	s_i [J/kg-C]	vf_i [m3/kg]	vg_i [m3/kg]	uf_i [J/kg]
1	25	104826	0.001003	104831	4.755	367.2	0.001005	29.55	134016
2	314	2.834E+06	56.98	3.105E+06	4.755	9674			
3		1.027E+06	17.34	1.082E+06	3.17	3643	0.001003	43.34	104827
4	766	3.602E+06	151.3	4.082E+06	3.17	11086			
5	25	2.410E+06	65.04	2.547E+06	2.113	8745	0.001002	63.59	77092
6	1350	4.798E+06	354.5	5.547E+06	2.113	12387			

Arrays Table: Main

	ug_i [J/kg]	x_i [-]
1	2.419E+06	
2		
3	2.409E+06	0.4
4		
5	2.400E+06	
6		

Parametric Table: 1a

	time [s]	v_2 [m3/kg]	u_2 [J/kg]	T_2 [C]	v_4 [m3/kg]	u_4 [J/kg]	T_4 [C]	v_6 [m3/kg]	u_6 [J/kg]
Run 1	1	*0.001003*	*105826*	*25.24*	*17.35*	*1.027E+06*	*25*	*65.16*	*2.410E+06*
Run 2	2	*0.001003*	*106826*	*25.48*	*17.37*	*1.028E+06*	*25*	*65.28*	*2.411E+06*
Run 3	3	*0.001003*	*107826*	*25.72*	*17.39*	*1.029E+06*	*25*	*65.39*	*2.412E+06*
Run 4	4	*0.001003*	*108826*	*25.96*	*17.41*	*1.030E+06*	*25*	*65.51*	*2.413E+06*

Parametric Table: 1a

	time [s]	v_2 [m3/kg]	u_2 [J/kg]	T_2 [C]	v_4 [m3/kg]	u_4 [J/kg]	T_4 [C]	v_6 [m3/kg]	u_6 [J/kg]
Run 5	5	0.001003	109826	26.2	17.43	1.031E+06	25	65.63	2.413E+06
Run 6	6	0.001003	110826	26.43	17.44	1.032E+06	25	65.74	2.414E+06
Run 7	7	0.001003	111826	26.67	17.46	1.033E+06	25	65.86	2.415E+06
Run 8	8	0.001004	112826	26.91	17.48	1.034E+06	25	65.98	2.416E+06
Run 9	9	0.001004	113826	27.15	17.5	1.035E+06	25	66.09	2.416E+06
Run 10	10	0.001004	114826	27.39	17.51	1.036E+06	25	66.21	2.417E+06
Run 11	11	0.001004	115826	27.63	17.53	1.037E+06	25	66.33	2.418E+06
Run 12	12	0.001004	116826	27.87	17.55	1.038E+06	25	66.44	2.419E+06
Run 13	13	0.001004	117826	28.11	17.57	1.039E+06	25	66.56	2.419E+06
Run 14	14	0.001004	118826	28.35	17.58	1.040E+06	25	66.67	2.420E+06
Run 15	15	0.001004	119826	28.59	17.6	1.041E+06	25	66.79	2.421E+06
Run 16	16	0.001004	120826	28.83	17.62	1.042E+06	25	66.91	2.422E+06
Run 17	17	0.001004	121826	29.07	17.64	1.043E+06	25	67.02	2.422E+06
Run 18	18	0.001004	122826	29.31	17.66	1.044E+06	25	67.14	2.423E+06
Run 19	19	0.001004	123826	29.54	17.67	1.044E+06	25	67.26	2.424E+06
Run 20	20	0.001004	124826	29.78	17.69	1.045E+06	25	67.37	2.425E+06
Run 21	21	0.001004	125826	30.02	17.71	1.046E+06	25	67.49	2.425E+06
Run 22	22	0.001004	126826	30.26	17.73	1.047E+06	25	67.61	2.426E+06
Run 23	23	0.001005	127826	30.5	17.74	1.048E+06	25	67.72	2.427E+06
Run 24	24	0.001005	128826	30.74	17.76	1.049E+06	25	67.84	2.428E+06
Run 25	25	0.001005	129826	30.98	17.78	1.050E+06	25	67.96	2.428E+06
Run 26	26	0.001005	130826	31.22	17.8	1.051E+06	25	68.07	2.429E+06
Run 27	27	0.001005	131826	31.46	17.82	1.052E+06	25	68.19	2.430E+06
Run 28	28	0.001005	132826	31.7	17.83	1.053E+06	25	68.31	2.431E+06
Run 29	29	0.001005	133826	31.94	17.85	1.054E+06	25	68.42	2.431E+06
Run 30	30	0.01088	134779	31.98	17.87	1.055E+06	25	68.54	2.432E+06
Run 31	60	0.3765	163041	31.98	18.4	1.083E+06	25	72.03	2.455E+06
Run 32	90	0.7421	191302	31.98	18.93	1.111E+06	25	75.52	2.477E+06
Run 33	120	1.108	219564	31.98	19.47	1.140E+06	25	79	2.500E+06
Run 34	150	1.473	247826	31.98	20	1.168E+06	25	82.46	2.523E+06
Run 35	180	1.839	276087	31.98	20.53	1.196E+06	25	85.92	2.545E+06
Run 36	210	2.204	304349	31.98	21.06	1.225E+06	25	89.36	2.568E+06
Run 37	240	2.57	332611	31.98	21.6	1.253E+06	25	92.79	2.591E+06
Run 38	270	2.936	360872	31.98	22.13	1.281E+06	25	96.21	2.614E+06
Run 39	300	3.301	389134	31.98	22.66	1.310E+06	25	99.61	2.637E+06
Run 40	330	3.667	417396	31.98	23.19	1.338E+06	25	103	2.659E+06
Run 41	360	4.032	445657	31.98	23.73	1.366E+06	25	106.4	2.682E+06
Run 42	390	4.398	473919	31.98	24.26	1.395E+06	25	109.7	2.705E+06
Run 43	420	4.764	502181	31.98	24.79	1.423E+06	25	113.1	2.728E+06
Run 44	450	5.129	530442	31.98	25.32	1.451E+06	25	116.4	2.751E+06
Run 45	480	5.495	558704	31.98	25.86	1.480E+06	25	119.7	2.774E+06
Run 46	510	5.86	586966	31.98	26.39	1.508E+06	25	123	2.797E+06
Run 47	540	6.226	615227	31.98	26.92	1.536E+06	25	126.3	2.820E+06
Run 48	570	6.592	643489	31.98	27.45	1.564E+06	25	129.5	2.843E+06
Run 49	600	6.957	671751	31.98	27.99	1.593E+06	25	132.8	2.866E+06
Run 50	630	7.323	700012	31.98	28.52	1.621E+06	25	136	2.890E+06
Run 51	660	7.688	728274	31.98	29.05	1.649E+06	25	139.2	2.913E+06
Run 52	690	8.054	756536	31.98	29.58	1.678E+06	25	142.4	2.936E+06
Run 53	720	8.42	784797	31.98	30.12	1.706E+06	25	145.6	2.959E+06
Run 54	750	8.785	813059	31.98	30.65	1.734E+06	25	148.8	2.983E+06

Parametric Table: 1a

	time [s]	v_2 [m3/kg]	u_2 [J/kg]	T_2 [C]	v_4 [m3/kg]	u_4 [J/kg]	T_4 [C]	v_6 [m3/kg]	u_6 [J/kg]
Run 55	780	9.151	841321	31.98	31.18	1.763E+06	25	152	3.006E+06
Run 56	810	9.516	869582	31.98	31.71	1.791E+06	25	155.1	3.029E+06
Run 57	840	9.882	897844	31.98	32.25	1.819E+06	25	158.2	3.053E+06
Run 58	870	10.25	926106	31.98	32.78	1.848E+06	25	161.4	3.076E+06
Run 59	900	10.61	954367	31.98	33.31	1.876E+06	25	164.5	3.100E+06
Run 60	930	10.98	982629	31.98	33.84	1.904E+06	25	167.5	3.123E+06
Run 61	960	11.34	1.011E+06	31.98	34.38	1.933E+06	25	170.6	3.146E+06
Run 62	990	11.71	1.039E+06	31.98	34.91	1.961E+06	25	173.7	3.170E+06
Run 63	1020	12.08	1.067E+06	31.98	35.44	1.989E+06	25	176.7	3.194E+06
Run 64	1050	12.44	1.096E+06	31.98	35.97	2.017E+06	25	179.8	3.217E+06
Run 65	1080	12.81	1.124E+06	31.98	36.51	2.046E+06	25	182.8	3.241E+06
Run 66	1110	13.17	1.152E+06	31.98	37.04	2.074E+06	25	185.8	3.264E+06
Run 67	1140	13.54	1.180E+06	31.98	37.57	2.102E+06	25	188.8	3.288E+06
Run 68	1170	13.9	1.209E+06	31.98	38.1	2.131E+06	25	191.8	3.312E+06
Run 69	1200	14.27	1.237E+06	31.98	38.64	2.159E+06	25	194.7	3.336E+06
Run 70	1230	14.63	1.265E+06	31.98	39.17	2.187E+06	25	197.7	3.359E+06
Run 71	1260	15	1.294E+06	31.98	39.7	2.216E+06	25	200.6	3.383E+06
Run 72	1290	15.37	1.322E+06	31.98	40.23	2.244E+06	25	203.5	3.407E+06
Run 73	1320	15.73	1.350E+06	31.98	40.77	2.272E+06	25	206.5	3.431E+06
Run 74	1350	16.1	1.378E+06	31.98	41.3	2.301E+06	25	209.4	3.455E+06
Run 75	1380	16.46	1.407E+06	31.98	41.83	2.329E+06	25	212.3	3.479E+06
Run 76	1410	16.83	1.435E+06	31.98	42.36	2.357E+06	25	215.1	3.502E+06
Run 77	1440	17.19	1.463E+06	31.98	42.9	2.386E+06	25	218	3.526E+06
Run 78	1470	17.56	1.491E+06	31.98	43.72	2.413E+06	27.62	220.9	3.550E+06
Run 79	1500	17.93	1.520E+06	31.98	46.05	2.436E+06	43.46	223.7	3.574E+06
Run 80	1530	18.29	1.548E+06	31.98	48.37	2.458E+06	59.36	226.5	3.598E+06
Run 81	1560	18.66	1.576E+06	31.98	50.69	2.481E+06	75.26	229.4	3.622E+06
Run 82	1590	19.02	1.604E+06	31.98	53.01	2.503E+06	91.13	232.2	3.646E+06
Run 83	1620	19.39	1.633E+06	31.98	55.32	2.526E+06	107	235	3.671E+06
Run 84	1650	19.75	1.661E+06	31.98	57.62	2.549E+06	122.8	237.8	3.695E+06
Run 85	1680	20.12	1.689E+06	31.98	59.92	2.572E+06	138.5	240.5	3.719E+06
Run 86	1710	20.48	1.717E+06	31.98	62.2	2.594E+06	154.2	243.3	3.743E+06
Run 87	1740	20.85	1.746E+06	31.98	64.48	2.617E+06	169.8	246.1	3.767E+06
Run 88	1770	21.22	1.774E+06	31.98	66.74	2.640E+06	185.3	248.8	3.791E+06
Run 89	1800	21.58	1.802E+06	31.98	69	2.663E+06	200.8	251.5	3.815E+06
Run 90	1830	21.95	1.830E+06	31.98	71.24	2.686E+06	216.2	254.3	3.840E+06
Run 91	1860	22.31	1.859E+06	31.98	73.48	2.709E+06	231.6	257	3.864E+06
Run 92	1890	22.68	1.887E+06	31.98	75.7	2.732E+06	246.9	259.7	3.888E+06
Run 93	1920	23.04	1.915E+06	31.98	77.92	2.755E+06	262.1	262.4	3.913E+06
Run 94	1950	23.41	1.944E+06	31.98	80.13	2.778E+06	277.2	265.1	3.937E+06
Run 95	1980	23.77	1.972E+06	31.98	82.32	2.801E+06	292.3	267.8	3.961E+06
Run 96	2010	24.14	2.000E+06	31.98	84.5	2.824E+06	307.3	270.5	3.986E+06
Run 97	2040	24.51	2.028E+06	31.98	86.68	2.847E+06	322.2	273.1	4.010E+06
Run 98	2070	24.87	2.057E+06	31.98	88.84	2.870E+06	337.1	275.8	4.034E+06
Run 99	2100	25.24	2.085E+06	31.98	91	2.893E+06	351.9	278.4	4.059E+06
Run 100	2130	25.6	2.113E+06	31.98	93.14	2.916E+06	366.6	281.1	4.083E+06
Run 101	2160	25.97	2.141E+06	31.98	95.28	2.939E+06	381.3	283.7	4.108E+06
Run 102	2190	26.33	2.170E+06	31.98	97.4	2.963E+06	395.9	286.3	4.132E+06
Run 103	2220	26.7	2.198E+06	31.98	99.52	2.986E+06	410.4	288.9	4.156E+06
Run 104	2250	27.07	2.226E+06	31.98	101.6	3.009E+06	424.8	291.5	4.181E+06

Parametric Table: 1a

	time [s]	v_2 [m3/kg]	u_2 [J/kg]	T_2 [C]	v_4 [m3/kg]	u_4 [J/kg]	T_4 [C]	v_6 [m3/kg]	u_6 [J/kg]
Run 105	2280	27.43	2.254E+06	31.98	103.7	3.033E+06	439.2	294.1	4.205E+06
Run 106	2310	27.8	2.283E+06	31.98	105.8	3.056E+06	453.5	296.7	4.230E+06
Run 107	2340	28.16	2.311E+06	31.98	107.9	3.080E+06	467.8	299.3	4.255E+06
Run 108	2370	28.53	2.339E+06	31.98	109.9	3.103E+06	482	301.9	4.279E+06
Run 109	2400	28.89	2.367E+06	31.98	112	3.126E+06	496.1	304.5	4.304E+06
Run 110	2430	29.26	2.396E+06	31.98	114	3.150E+06	510.2	307	4.328E+06
Run 111	2460	29.85	2.423E+06	34.96	116.1	3.174E+06	524.2	309.6	4.353E+06
Run 112	2490	31.39	2.446E+06	50.75	118.1	3.197E+06	538.1	312.1	4.377E+06
Run 113	2520	32.94	2.468E+06	66.6	120.1	3.221E+06	552	314.7	4.402E+06
Run 114	2550	34.49	2.491E+06	82.45	122.1	3.244E+06	565.8	317.2	4.427E+06
Run 115	2580	36.03	2.514E+06	98.28	124.2	3.268E+06	579.6	319.7	4.451E+06
Run 116	2610	37.56	2.536E+06	114.1	126.1	3.292E+06	593.3	322.3	4.476E+06
Run 117	2640	39.1	2.559E+06	129.8	128.1	3.315E+06	606.9	324.8	4.501E+06
Run 118	2670	40.62	2.582E+06	145.5	130.1	3.339E+06	620.5	327.3	4.525E+06
Run 119	2700	42.14	2.604E+06	161.2	132.1	3.363E+06	634	329.8	4.550E+06
Run 120	2730	43.66	2.627E+06	176.7	134	3.387E+06	647.4	332.3	4.575E+06
Run 121	2760	45.16	2.650E+06	192.3	136	3.410E+06	660.8	334.8	4.600E+06
Run 122	2790	46.66	2.673E+06	207.7	137.9	3.434E+06	674.2	337.3	4.624E+06
Run 123	2820	48.16	2.696E+06	223.1	139.9	3.458E+06	687.5	339.7	4.649E+06
Run 124	2850	49.65	2.719E+06	238.4	141.8	3.482E+06	700.7	342.2	4.674E+06
Run 125	2880	51.13	2.742E+06	253.7	143.7	3.506E+06	713.9	344.7	4.699E+06
Run 126	2910	52.6	2.765E+06	268.8	145.6	3.530E+06	727	347.2	4.723E+06
Run 127	2940	54.07	2.788E+06	283.9	147.5	3.554E+06	740.1	349.6	4.748E+06
Run 128	2970	55.53	2.811E+06	299	149.4	3.578E+06	753.1	352.1	4.773E+06
Run 129	3000	56.98	2.834E+06	314	151.3	3.602E+06	766	354.5	4.798E+06

Parametric Table: 1a

	T_6 [C]
Run 1	25.53
Run 2	26.06
Run 3	26.59
Run 4	27.12
Run 5	27.65
Run 6	28.18
Run 7	28.71
Run 8	29.24
Run 9	29.77
Run 10	30.3
Run 11	30.83
Run 12	31.36
Run 13	31.89
Run 14	32.42
Run 15	32.95
Run 16	33.48
Run 17	34.02
Run 18	34.55
Run 19	35.08
Run 20	35.61

Parametric Table: 1a

	T_6 [C]
Run 21	36.14
Run 22	36.67
Run 23	37.2
Run 24	37.73
Run 25	38.26
Run 26	38.8
Run 27	39.33
Run 28	39.86
Run 29	40.39
Run 30	40.92
Run 31	56.87
Run 32	72.79
Run 33	88.69
Run 34	104.5
Run 35	120.4
Run 36	136.1
Run 37	151.8
Run 38	167.4
Run 39	183
Run 40	198.5
Run 41	213.9
Run 42	229.3
Run 43	244.6
Run 44	259.8
Run 45	275
Run 46	290
Run 47	305.1
Run 48	320
Run 49	334.9
Run 50	349.7
Run 51	364.4
Run 52	379.1
Run 53	393.7
Run 54	408.2
Run 55	422.7
Run 56	437.1
Run 57	451.4
Run 58	465.7
Run 59	479.9
Run 60	494
Run 61	508.1
Run 62	522.1
Run 63	536
Run 64	549.9
Run 65	563.8
Run 66	577.5
Run 67	591.2
Run 68	604.9
Run 69	618.4
Run 70	632

Parametric Table: 1a

	T_6 [C]
Run 71	645.4
Run 72	658.8
Run 73	672.2
Run 74	685.5
Run 75	698.7
Run 76	711.9
Run 77	725
Run 78	738.1
Run 79	751.1
Run 80	764.1
Run 81	777
Run 82	789.9
Run 83	802.7
Run 84	815.5
Run 85	828.2
Run 86	840.9
Run 87	853.5
Run 88	866.1
Run 89	878.7
Run 90	891.1
Run 91	903.6
Run 92	916
Run 93	928.4
Run 94	940.7
Run 95	953
Run 96	965.2
Run 97	977.4
Run 98	989.6
Run 99	1002
Run 100	1014
Run 101	1026
Run 102	1038
Run 103	1050
Run 104	1062
Run 105	1074
Run 106	1086
Run 107	1097
Run 108	1109
Run 109	1121
Run 110	1133
Run 111	1144
Run 112	1156
Run 113	1168
Run 114	1179
Run 115	1191
Run 116	1202
Run 117	1214
Run 118	1225
Run 119	1237
Run 120	1248

Parametric Table: 1a

	T_6 [C]
Run 121	*1260*
Run 122	*1271*
Run 123	*1282*
Run 124	*1294*
Run 125	*1305*
Run 126	*1316*
Run 127	*1328*
Run 128	*1339*
Run 129	*1350*