Table 1 - Vortex Engine Process Calculations.

Air properties:	**Case 1**	**Case 2**	**Case 3**	**Case 4**
P_1 (kPa)	**101.1**	101.1	101.1	101.1
T_1 (°C)	**25.8**	25.8	25.8	**33.6**
$r_1 = r_2$ (g/kg)	**16.87**	16.87	16.87	16.87
U_1 (%)	**80.0**	80.0	80.0	50.1
$s_1 = s_2$ (J/K· kg)	241.0	241.0	241.0	267.7
h_1 (J/kg)	68910	68910	68910	76990
$P_2 = P_3$ (kPa)	101.1	97.72	97.70	97.73
ΔP_{12}	0	3.38	3.40	3.37
T_2 (°C)	25.8	22.92	22.91	30.6
U_2 (%)	80.0	92.3	92.3	57.6
h_2 (J/kg)	68910	65930	65920	73940
T_3 (°C)	25.8	**24.5**	**30.7**	30.6
U_3 (%)	80	**97**	57.4	57.6
$r_3 = r_4$ (g/kg)	16.87	**19.57**	**16.87**	**16.87**
$h_3 = \mu_3 = \mu_4$ (J/kg)	68910	74430	73990	73940
$s_3 = s_4$ (J/K· kg)	241.0	269.7	268.0	267.7
P_4 (kPa)	10.0	10.0	10.0	10.0
T_4 (°C)	-87.1	-80.92	-82.2	-82.3
z_4 (m)	16570	16570	16570	16570
h_4 (J/kg)	-96210	-91130	-91150	-91180
Heat Input (J/kg)				
$Q = h_3 - h_2$	**0**	**8500**	**8070**	**8080**
Work (J/kg)				
$W = h_1 - h_2$	**0**	**2980**	**2990**	**3050**
Velocity (m/s)				
$v = (2\ W)^{0.5}$	**0**	**77.2**	**77.4**	**78.1**
Efficiency (%)				
$n\ (\%) = W_{12}/Q_{23}$	n/a	**35.1**	**37.1**	**37.8**
$n\ (\%) = 1 - T_4/T_3$	n/a	**35.4**	**37.2**	**37.2**
Heat source	None	26°C water at P_2	36°C dry heat at P_2	40°C dry heat at P_1