Spread Sheet to Calculate Water Tank Storage Temperature over one day

Assumes that the tank is fully mixed.

Initialization Data

					Solar Collect
Initial Temperature in Water Tank	52	C			SRCC #
Volume of Storage Tank	80	gallons	0.302833	m^3	Heliodyne Gol
Density of Water	990	kg/m^3			Gross Area
Specific Heat of Water	4180	J/kg-k			Tested Volum
Temperature of City Water	15	C			Volume Flow
Number of Solar Panels	1				efficiency Y-in
Flow rate of water through all panels	82.8504	m^3/s			efficiency slop
Temperature of Air Around Tank	19	C			Incident Angle
Tank Loss Coefficient	3	W/C			
Mass of Water in Tank	299.804613	kg			

Site Data

Collector Tilt (beta)	15	degrees	0.261799	radians
Surface Azimuth	0	degrees	0	radians
Latitude	32	degrees	0.558505	radians
Day of year May 1st	121			
declination (delta)	14.90088746	degrees	0.26007	radians
Direct Beam Flux	750	W/m^2		
term1 of cos(theta)	0.131624348			
term2 of cos(theta)	0.056441619			

Solar Time	Hour Angle (degrees)	Hour Angle (radians)	term 3 of cos(theta)	term 4 of cos(theta)	term 5 of cos(theta)	cos(theta)	theta (radians)	theta (degrees)	1/cos(theta) - 1	Incident Angle Modifier	Ambient Temperature (C)
6:00:00	-90	-1.5708	4.84917E-17	8.11912E-18	0	0.075183	1.495543	85.688278	12.30092707	-1.09116	14
6:05:00	-88.75	-1.54898	0.017268777	0.002891367	0	0.095343	1.475308	84.528945	9.48846093	-0.61304	14
6:10:00	-87.5	-1.52716	0.034529334	0.005781358	0	0.115493	1.455045	83.367914	7.658501794	-0.30195	14
6:15:00	-86.25	-1.50535	0.051773458	0.008668598	0	0.135625	1.434752	82.20525	6.37328359	-0.08346	14
6:20:00	-85	-1.48353	0.06899294	0.011551711	0	0.155727	1.414433	81.041016	5.421478331	0.078349	14
6:25:00	-83.75	-1.46171	0.086179585	0.014429327	0	0.175792	1.394086	79.87527	4.688552603	0.202946	14
6:30:00	-82.5	-1.4399	0.103325214	0.017300075	0	0.195808	1.373715	78.70807	4.107043164	0.301803	14
6:35:00	-81.25	-1.41808	0.120421665	0.020162589	0	0.215767	1.353319	77.539472	3.634629376	0.382113	14
6:40:00	-80	-1.39626	0.137460802	0.023015507	0	0.235659	1.3329	76.369526	3.243418825	0.448619	14