



APPENDIX C

Window Glazing Design Calculations

C.1 ASHRAE 2005 Handbook of Fundamentals Solar Angles and Total Irradiance Formulas

C.2 Monthly Total Surface Irradiance Calculations

C.3 Monthly Fenestration Heat Transfer Analysis



Table 14 Solar Equations

Solar Angles	Direct, Diffuse, and Total Solar Irradiance
<p>All angles are in degrees. The solar azimuth ϕ and the surface azimuth ψ are measured in degrees from south; angles to the east of south are negative, and angles to the west of south are positive. Calculate solar altitude, azimuth, and surface incident angles as follows:</p> <p>Apparent solar time AST, in decimal hours: $AST = LST + ET/60 + (LSM - LON)/15$ Hour angle H, degrees: $H = 15(\text{hours of time from local solar noon}) = 15(AST - 12)$ Solar altitude β: $\sin \beta = \cos L \cos \delta \cos H + \sin L \sin \delta$ Solar azimuth ϕ: $\cos \phi = (\sin \beta \sin L - \sin \delta) / (\cos \beta \cos L)$ Surface-solar azimuth γ: $\gamma = \phi - \psi$ Incident angle θ: $\cos \theta = \cos \beta \cos \gamma \sin \Sigma + \sin \beta \cos \Sigma$ where ET = equation of time, decimal minutes L = latitude LON = local longitude, decimal degrees of arc LSM = local standard time meridian, decimal degrees of arc = 60° for Atlantic Standard Time = 75° for Eastern Standard Time = 90° for Central Standard Time = 105° for Mountain Standard Time = 120° for Pacific Standard Time = 135° for Alaska Standard Time = 150° for Hawaii-Aleutian Standard Time LST = local standard time, decimal hours δ = solar declination, ° ψ = surface azimuth, ° Σ = surface tilt from horizontal, horizontal = 0° </p> <p>Values of ET and δ are given in Table 7 of Chapter 31 for the 21st day of each month.</p>	<p>Direct normal irradiance E_{DN}</p> <p>If $\beta > 0$ $E_{DN} = \left[\frac{A}{\exp(B/\sin\beta)} \right] CN$</p> <p>Otherwise, $E_{DN} = 0$</p> <p>Surface direct irradiance E_D</p> <p>If $\cos \theta > 0$ $E_D = E_{DN} \cos \theta$</p> <p>Otherwise, $E_D = 0$</p> <p>Ratio Y of sky diffuse on vertical surface to sky diffuse on horizontal surface</p> <p>If $\cos \theta > -0.2$ $Y = 0.55 + 0.437 \cos \theta + 0.313 \cos^2 \theta$</p> <p>Otherwise, $Y = 0.45$</p> <p>Diffuse irradiance E_d</p> <p>Vertical surfaces $E_d = CYE_{DN}$</p> <p>Surfaces other than vertical $E_d = CE_{DN}(1 + \cos \Sigma)/2$</p> <p>Ground-reflected irradiance $E_r = E_{DN}(C + \sin \beta)\rho_g(1 - \cos \Sigma)/2$</p> <p>Total surface irradiance $E_t = E_D + E_d + E_r$</p> <p>where</p> <p>A = apparent solar constant B = atmospheric extinction coefficient C = sky diffuse factor CN = clearness number multiplier for clear/dry or hazy/humid locations. See Figure 5 in Chapter 33 of the 2003 ASHRAE Handbook—HVAC Applications for CN values. E_d = diffuse sky irradiance E_r = diffuse ground-reflected irradiance ρ_g = ground reflectivity</p> <p>Values of A, B, and C are given in Table 7 of Chapter 31 for the 21st day of each month. Values of ground reflectivity ρ_g are given in Table 10 of Chapter 31.</p>



May Total Surface Irradiance

LST	AST	H	β	φ	EDN	Er	North			South			East			West				
							Y	ED	θ	Y	ED	θ	Y	ED	θ	Y	ED	θ		
0	-0.08	-181.21	-31.10	178.68	0.00	0.00	178.68	148.88	0.00	0.00	268.68	91.13	0.00	0.00	88.68	88.87	0.00	0.00	0.00	0.00
1	0.92	-166.21	-29.71	165.05	0.00	0.00	-14.95	32.95	0.00	0.45	0.00	265.05	102.95	0.00	0.00	75.05	77.05	0.00	0.00	0.00
2	1.84	-151.21	-28.23	148.98	0.00	0.00	169.98	141.56	0.00	0.45	0.00	239.98	116.91	0.00	0.00	59.98	63.09	0.00	0.81	0.00
3	2.82	-136.21	-18.25	136.78	0.00	0.00	-43.22	46.21	0.00	0.45	0.00	226.78	130.57	0.00	0.00	46.78	49.43	0.00	0.97	0.00
4	3.92	-121.21	-9.45	126.43	0.00	0.00	-54.57	55.12	0.00	0.90	0.00	215.43	143.49	0.00	0.00	35.43	36.51	0.00	1.10	0.00
5	4.92	-106.21	0.61	115.52	0.00	0.00	-64.48	64.48	0.00	0.80	0.00	205.52	164.47	0.00	0.00	25.52	25.53	0.00	1.20	0.00
6	5.92	-91.21	11.50	106.52	140.83	7.42	-73.48	73.82	39.24	0.70	12.74	187.83	165.87	0.00	8.24	15.66	16.52	20.03	132.31	1.24
7	6.92	-76.21	22.90	97.83	217.16	18.04	-82.17	82.79	27.26	0.61	17.21	178.75	145.44	0.00	14.12	32.15	30.74	7.83	24.13	198.17
8	7.92	-61.21	34.54	88.75	250.46	27.93	-91.25	91.03	0.00	0.54	18.17	168.82	132.71	0.00	15.12	34.56	206.26	1.12	36.54	270.73
9	8.92	-46.21	46.13	78.17	267.72	36.45	-101.83	98.17	0.00	0.49	17.20	158.91	119.13	0.00	16.51	47.29	181.59	0.99	34.47	252.51
10	9.92	-31.21	57.17	63.91	277.23	43.04	-116.09	103.79	0.00	0.45	16.22	133.35	91.71	0.00	18.09	60.87	134.97	0.84	30.16	208.17
11	10.92	-16.21	66.50	41.13	282.16	47.27	-138.87	107.48	0.00	0.45	16.51	113.13	70.20	0.00	20.09	74.80	73.99	0.69	25.17	146.43
12	11.92	-1.21	71.08	3.49	283.83	48.86	-176.51	108.88	0.00	0.45	16.60	89.49	49.13	0.00	22.02	88.74	68.84	0.51	26.62	75.09
13	12.92	13.80	67.68	36.15	282.63	47.71	-143.85	107.86	0.00	0.45	16.53	64.24	26.21	0.00	23.87	86.51	63.33	0.66	24.38	135.42
14	13.92	28.80	58.84	61.01	278.28	43.89	-118.99	104.52	0.00	0.45	16.28	40.17	11.61	0.00	25.00	80.17	63.09	0.81	29.37	199.22
15	14.92	43.80	47.98	103.79	269.65	37.65	-93.79	99.19	0.00	0.48	17.11	21.50	3.05	0.00	25.77	63.43	43.79	1.07	33.88	269.90
16	15.92	58.80	36.42	154.00	234.91	29.41	-62.81	92.26	0.00	0.53	17.61	4.70	0.00	0.00	25.88	43.68	27.27	1.20	38.43	269.90
17	16.92	73.80	24.76	206.42	198.70	21.16	-42.81	84.17	22.78	0.68	17.42	59.80	96.42	0.00	0.51	34.53	166.42	1.42	42.81	269.90
18	17.92	88.80	13.30	258.12	158.56	9.14	-24.88	75.30	40.25	0.88	14.04	63.43	105.12	0.00	0.45	42.81	195.12	1.42	46.81	269.90
19	18.92	103.80	2.31	310.03	4.25	0.12	-65.97	65.99	1.73	0.78	0.43	2.27	114.03	0.00	0.45	50.00	204.03	1.42	50.00	269.90
20	19.92	118.80	-7.91	361.76	0.00	0.00	-56.24	56.61	0.00	0.89	0.00	0.00	123.76	0.00	0.45	60.00	213.76	1.42	60.00	269.90
21	20.92	133.80	-16.95	413.84	0.00	0.00	-45.16	47.58	0.00	0.99	0.00	0.00	134.84	0.00	0.45	70.00	224.84	1.42	70.00	269.90
22	21.92	148.80	-24.26	467.92	0.00	0.00	-32.28	39.57	0.00	1.07	0.00	0.00	147.92	0.00	0.45	80.00	237.92	1.42	80.00	269.90
23	22.92	163.80	-29.18	518.00	0.00	0.00	-17.48	33.62	0.00	1.13	0.00	0.00	162.52	0.00	0.45	90.00	252.52	1.42	90.00	269.90

June Total Surface Irradiance

LST	AST	H	β	φ	EDN	Er	North			South			East			West					
							Y	ED	θ	Y	ED	θ	Y	ED	θ	Y	ED	θ			
0	-0.16	-182.38	-27.62	177.54	0.00	0.00	-2.46	27.72	0.00	1.18	0.00	177.54	152.28	0.00	0.45	0.00	267.54	92.18	0.00	0.00	
1	0.84	-167.38	-26.55	167.70	0.00	0.00	-12.95	29.33	0.00	1.17	0.00	167.05	150.87	0.00	0.45	0.00	257.05	101.56	0.00	0.00	
2	1.84	-152.38	-22.51	152.59	0.00	0.00	-27.41	34.91	0.00	1.12	0.00	152.59	145.09	0.00	0.45	0.00	242.59	115.17	0.00	0.00	
3	2.84	-137.38	-16.00	138.74	0.00	0.00	-40.26	42.81	0.00	1.04	0.00	139.74	137.19	0.00	0.45	0.00	229.74	128.40	0.00	0.00	
4	3.84	-122.38	-7.62	128.59	0.00	0.00	-51.41	51.82	0.00	0.94	0.00	128.59	128.18	0.00	0.45	0.00	218.59	140.78	0.00	0.00	
5	4.84	-107.38	2.09	118.82	2.14	0.06	-61.18	61.20	1.03	0.83	0.24	118.82	151.11	0.00	0.45	0.13	0.19	208.82	151.11	0.00	0.00
6	5.84	-92.38	12.72	110.00	145.61	8.32	-70.00	70.51	48.58	0.73	14.58	110.00	109.49	0.00	0.45	8.98	17.30	200.00	156.44	0.00	
7	6.84	-77.38	23.94	101.61	213.85	18.57	-78.39	79.40	39.33	0.64	18.78	76.68	101.61	0.00	0.48	10.64	191.61	144.38	0.00	0.00	
8	7.84	-62.38	35.51	93.01	245.34	28.18	-86.99	87.55	50.48	0.52	19.13	57.79	93.01	0.00	0.53	17.88	173.22	119.43	0.00	0.00	
9	8.84	-47.38	47.17	83.22	262.13	36.50	-96.78	94.60	0.00	0.48	18.56	55.07	83.22	0.00	0.59	17.08	160.22	119.43	0.00	0.00	
10	9.84	-32.38	58.53	70.22	271.57	43.01	-109.78	100.18	0.00	0.48	17.95	60.96	70.22	0.00	0.67	16.54	144.69	105.90	0.00	0.00	
11	10.84	-17.38	68.64	48.80	278.57	47.27	-131.20	103.88	0.00	0.45	17.05	64.33	48.80	0.00	0.83	15.36	133.80	105.90	0.00	0.00	
12	11.84	-2.38	74.43	38.46	277.40	49.01	-171.84	105.41	0.00	0.45	17.16	66.18	8.16	0.00	1.05	14.24	128.40	105.90	0.00	0.00	
13	12.84	12.62	71.20	38.46	277.40	48.11	-141.54	104.61	0.00	0.45	17.11	65.21	38.46	0.00	1.08	13.36	128.40	105.90	0.00	0.00	
14	13.84	27.62	61.95	64.75	275.55	44.62	-115.25	101.57	0.00	0.45	16.86	61.49	64.75	0.00	1.10	12.63	128.40	105.90	0.00	0.00	
15	14.84	42.62	50.83	79.59	265.74	38.79	-90.41	96.55	0.00	0.50	16.36	57.15	79.59	0.00	1.12	11.99	128.40	105.90	0.00	0.00	
16	15.84	57.62	39.22	101.00	251.77	30.98	-68.90	89.93	0.00	0.55	15.85	49.94	101.00	0.00	1.14	11.40	128.40	105.90	0.00	0.00	
17	16.84	72.62	27.59	108.94	226.26	21.73	-51.06	82.09	31.15	0.62	15.10	43.98	98.94	0.00	1.16	10.84	128.40	105.90	0.00	0.00	
18	17.84	87.62	16.23	137.32	174.03	11.60	-32.68	73.39	49.74	0.70	14.36	37.09	108.94	0.00	1.18	10.33	128.40	105.90	0.00	0.00	
19	18.84	102.62	5.38	165.95	46.97	1.73	-16.05	64.18	20.46	0.80	13.64	30.56	108.94	0.00	1.20	9.84	128.40	105.90	0.00	0.00	
20	19.84	117.62	-4.66	192.36	0.00	0.00	-54.64	54.78	0.00	0.91	13.00	23.66	108.94	0.00	1.22	9.40	128.40	105.90	0.00	0.00	
21	20.84	132.62	-13.51	218.32	0.00	0.00	-43.97	45.59	0.00	1.01	12.40	16.82	108.94	0.00	1.24	9.00	128.40	105.90	0.00	0.00	
22	21.84	147.62	-20.68	246.32	0.00	0.00	-31.68	37.23	0.00	1.10	11.80	10.33	108.94	0.00	1.26	8.60	128.40	105.90	0.00	0.00	
23	22.84	162.62	-25.57	282.31	0.00	0.00	-17.69	30.75	0.00	1.16	11.20	4.66	108.94	0.00	1.28	8.20	128.40	105.90	0.00	0.00	

July Total Surface Irradiance

LST	AST	H	β	φ	EDN	Er	North			South			East			West		
							Y	ED	θ	Y	ED	θ	Y	ED	θ	Y	ED	θ
0	-0.24	-185.58	-30.42	176.11	0.00	0.00	-3.89	30.64	0.00	1.16	0.00	176.11	149.36	0.00	0.45	0.00		



January Fenestration Analysis

time	CONDUCTION = Q _{cond} = UA(ΔT)						SOLAR RADIATION = Q _{sol} = SHGC(A)(E _i)						TOTAL ENERGY TRANSFER			SAVINGS (Cooling Only)					
	T _o	T _i	ΔT	VE 1-85	VRE 1-67	VNE 1-63	E _{i,N}	E _{i,S}	E _{i,E}	E _{i,W}	VE 1-85	VRE 1-67	VNE 1-63	VE 1-85	VRE 1-67	VNE 1-63	VRE 1-67	VNE 1-63			
0:00	41.0	60	-19.0	-143009.2	-138396	-133783	0.00	0.00	0.00	0.00	0	0	0	-143009	-138396	-133783	0	0			
1:00	40.0	60	-20.0	-150536	-145680	-140824	0.00	0.00	0.00	0.00	0	0	0	-150536	-145680	-140824	0	0			
2:00	38.7	60	-21.3	-160320.84	-155149.2	-149978	0.00	0.00	0.00	0.00	0	0	0	-160321	-155149	-149978	0	0			
3:00	37.5	60	-22.5	-169353	-163890	-158427	0.00	0.00	0.00	0.00	0	0	0	-169353	-163890	-158427	0	0			
4:00	36.3	60	-23.7	-178385.16	-172630.8	-166876	0.00	0.00	0.00	0.00	0	0	0	-178385	-172631	-166876	0	0			
5:00	35.5	60	-24.5	-184406.6	-178458	-172509	0.00	0.00	0.00	0.00	0	0	0	-184407	-178458	-172509	0	0			
6:00	35.0	70	-35.0	-263438	-254940	-246442	0.00	0.00	0.00	0.00	0	0	0	-263438	-254940	-246442	0	0			
7:00	35.3	70	-34.7	-261179.96	-252754.8	-244330	0.00	0.00	0.00	0.00	0	0	0	-261180	-252755	-244330	0	0			
8:00	36.8	70	-33.2	-249899.76	-241828.8	-233768	6.73	54.81	6.73	86.02	510730	368861	264823	260840	127032	31055	133808	229785			
9:00	39.3	70	-30.7	-231072.76	-223618.8	-216165	22.32	172.50	22.32	189.16	1342815	969811	696275	1111743	746192	480110	365550	631633			
10:00	42.3	70	-27.7	-208492.36	-201766.8	-195041	32.09	241.55	32.09	181.69	1608417	1161634	833994	1399925	959688	638953	440057	760972			
11:00	45.5	70	-24.5	-184406.6	-178458	-172509	38.21	283.70	38.21	133.82	1627135	1175153	843700	1442728	996695	671190	446033	771538			
12:00	50.0	70	-20.0	-150536	-145680	-140824	40.97	302.54	42.93	67.28	1491941	1077513	773599	1341405	931833	632775	409572	708630			
13:00	51.2	70	-18.8	-141503.84	-136939.2	-132375	40.37	298.46	41.41	92.24	1554675	1122821	806128	1413171	985882	673753	427290	739418			
14:00	51.0	70	-19.0	-143009.2	-138396	-133783	36.42	271.43	36.42	153.80	1641798	1185743	851303	1498789	1047347	717520	451442	781269			
15:00	50.3	70	-19.7	-148277.96	-143494.8	-138712	29.07	220.48	29.07	190.75	1549764	1119274	803581	1401486	975779	664870	425707	736616			
16:00	49.3	70	-20.7	-155804.76	-150778.8	-145753	17.68	138.67	17.68	172.65	1146461	827999	594461	990656	677221	448708	313435	541948			
17:00	48.5	70	-21.5	-161826.2	-156606	-151386	0.37	3.12	0.37	5.59	31310	22613	16235	-130516	-133993	-135151	0	0			
18:00	47.3	70	-22.7	-170858.36	-165346.8	-159835	0.00	0.00	0.00	0.00	0	0	0	-170858	-165347	-159835	0	0			
19:00	46.2	70	-23.8	-179137.84	-173359.2	-167581	0.00	0.00	0.00	0.00	0	0	0	-179138	-173359	-167581	0	0			
20:00	45.0	70	-25.0	-188170	-182100	-176030	0.00	0.00	0.00	0.00	0	0	0	-188170	-182100	-176030	0	0			
21:00	44.0	60	-16.0	-120428.8	-116544	-112659	0.00	0.00	0.00	0.00	0	0	0	-120429	-116544	-112659	0	0			
22:00	42.9	60	-17.1	-128708.28	-124556.4	-120405	0.00	0.00	0.00	0.00	0	0	0	-128708	-124556	-120405	0	0			
23:00	42.0	60	-18.0	-135482.4	-131112	-126742	0.00	0.00	0.00	0.00	0	0	0	-135482	-131112	-126742	0	0			
													8296813	4958938	2547364	3412895	5901809				

February Fenestration Analysis

time	CONDUCTION = Q _{cond} = UA(ΔT)						SOLAR RADIATION = Q _{sol} = SHGC(A)(E _i)						TOTAL ENERGY TRANSFER			SAVINGS (Cooling Only)					
	T _o	T _i	ΔT	VE 1-85	VRE 1-67	VNE 1-63	E _{i,N}	E _{i,S}	E _{i,E}	E _{i,W}	VE 1-85	VRE 1-67	VNE 1-63	VE 1-85	VRE 1-67	VNE 1-63	VRE 1-67	VNE 1-63			
0:00	36.5	60	-23.5	-176879.8	-171174	-165468	0.00	0.00	0.00	0.00	0	0	0	-176880	-171174	-165468	0	0			
1:00	35.3	60	-24.7	-185911.96	-179914.8	-173918	0.00	0.00	0.00	0.00	0	0	0	-185912	-179915	-173918	0	0			
2:00	34.0	60	-26.0	-195696.8	-189384	-183071	0.00	0.00	0.00	0.00	0	0	0	-195697	-189384	-183071	0	0			
3:00	32.7	60	-27.3	-205481.64	-198853.2	-192225	0.00	0.00	0.00	0.00	0	0	0	-205482	-198853	-192225	0	0			
4:00	31.6	60	-28.4	-213761.12	-206865.6	-199970	0.00	0.00	0.00	0.00	0	0	0	-213761	-206866	-199970	0	0			
5:00	30.7	60	-29.3	-220535.24	-213421.2	-206307	0.00	0.00	0.00	0.00	0	0	0	-220535	-213421	-206307	0	0			
6:00	30.7	70	-39.3	-298503.24	-286261.2	-276719	0.00	0.00	0.00	0.00	0	0	0	-298503	-286261	-276719	0	0			
7:00	31.5	70	-38.5	-289781.8	-280434	-271086	0.00	0.00	0.00	0.00	0	0	0	-289782	-280434	-271086	0	0			
8:00	33.7	70	-36.3	-273222.84	-264409.2	-255596	17.14	95.45	17.14	191.74	1064467	768782	551946	791244	504373	296350	286872	494894			
9:00	36.5	70	-33.5	-252147.8	-244014	-235880	30.53	175.77	30.53	235.43	1561183	1127521	809502	1309036	883507	573622	425528	735413			
10:00	39.0	70	-31.0	-233330.8	-225804	-218277	39.90	233.98	39.90	210.74	1731073	1250219	897593	1497742	1024415	679316	473327	818426			
11:00	41.7	70	-28.3	-213008.44	-206137.2	-199266	46.03	272.68	46.03	154.18	1709525	1234657	886420	1496517	1028520	687154	467997	809362			
12:00	44.5	70	-25.5	-191933.4	-185742	-179551	48.92	291.00	50.80	81.02	1551141	1120269	804295	1359208	934527	624745	424681	734643			
13:00	46.3	70	-23.7	-178385.16	-172630.8	-166876	48.47	288.17	49.61	101.46	1604503	1158808	831965	1426118	986177	665088	439941	761030			
14:00	46.6	70	-23.4	-176127.12	-170445.6	-164764	44.72	264.33	44.72	171.34	1730757	1249991	897430	1554630	1079546	732665	475084	821964			
15:00	46.2	70	-23.8	-179137.84	-173359.2	-167581	37.73	220.39	37.73	221.27	1707425	1233140	885331	1528287	1095978	717751	468506	810536			
16:00	45.5	70	-24.5	-184406.6	-178458	-172509	27.44	156.90	27.44	233.21	1471674	1062876	763090	1282767	884418	590581	402850	696687			
17:00	44.3	70	-25.7	-193438.76	-187198.8	-180959	12.46	68.42	12.46	154.84	822148	593773	426299	628709	406575	245340	222134	383369			
18:00	43.3	70	-26.7	-200965.56	-194482.8	-188000	0.00	0.00	0.00	0.00	0	0	0	-200966	-194483	-188000	0	0			
19:00	42.0	70	-28.0	-210750.4	-203952	-197154	0.00	0.00	0.00	0.00	0	0	0	-210750	-203952	-197154	0	0			
20:00	40.8	70	-29.2	-219782.56	-212692.8	-205603	0.00	0.00	0.00	0.00	0	0	0	-219783	-212693	-205603	0	0			
21:00	39.6	60	-20.4	-153546.72	-148593.6	-143640	0.00	0.00	0.00	0.00	0	0	0	-153547	-148594	-143640	0	0			
22:00	38.5	60	-21.5	-161826.2	-156606	-151386	0.00	0.00	0.00	0.00	0	0	0	-161826	-156606	-151386	0	0			
23:00	37.5	60	-22.5	-169353	-163890	-158427	0.00	0.00	0.00	0.00	0	0	0	-169353	-163890	-158427	0	0			
													9978682	5985312	3099639	4086920	7066144				

March Fenestration Analysis

time	CONDUCTION = Q _{cond} = UA(ΔT)						SOLAR RADIATION = Q _{sol} = SHGC(A)(E _i)						TOTAL ENERGY TRANSFER			SAVINGS (Cooling Only)		
	T _o	T _i	ΔT	VE 1-85	VRE 1-67	VNE 1-63	E _{i,N}	E _{i,S}	E _{i,E}	E _{i,W}	VE 1-85	VRE 1-67	VNE 1-63	VE 1-85	VRE 1-67	VNE 1-63	VRE 1-67	VNE 1-63
0:00	46.2	60	-13.8	-103869.84	-100519.2	-97169	0.00	0.00	0.00	0.00	0	0	0	-103870	-100519	-97169	0	0
1:00	44.8	60	-15.2	-114407.36	-110716.8	-107026	0.00	0.00	0.00	0.00	0	0	0	-114407	-110717	-107026	0	0
2:00	43.0	60	-17.0	-127955.6	-123828	-119700	0.00	0.00	0.00	0.00	0	0	0	-127956	-123828	-119700	0	0
3:00	41.5	60	-18.5	-139245.8	-134754	-130262	0.00	0.00	0.00	0.00	0	0	0	-139246	-134754	-130262	0	0
4:00	40.0	60	-20.0	-150536	-145680	-140824	0.00	0.00	0.00	0.00	0	0	0	-150536	-145680	-140824	0	0
5:00	38.8	60	-21.2	-159568.16	-154420.8	-149273	0.00	0.00	0.00	0.00	0	0	0	-159568	-154421	-149273	0	0
6:00	38.3	70	-31.7	-238599.56	-230902.8	-223206	0.00	0.00	0.00	0.00	0	0	0	-238600	-230903	-223206	0	0
7:00	39.0	70	-31.0	-233330.8	-225804	-218277	12.79	30.39	12.03	154.64	695898	502593	360836	462567	276789	142559	185778	320008
8:00	40.6	70	-29.4	-221287.92	-214149.6	-207011	28.23	98.74	28.23	256.23	1362275	983865	706365	1140987	769716	499353	371271	641633
9:00	43.2	70	-26.8	-201718.24	-195211.2	-188704	39.89	160.62	39.89	260.31	1655023	119						



April Fenestration Analysis

time	CONDUCTION = $Q_{cond} = UA(\Delta T)$						SOLAR RADIATION = $Q_{sol} = SHGC(A)(E_t)$						TOTAL ENERGY TRANSFER			SAVINGS (Cooling Only)				
	T_o	T_i	ΔT	VE 1-85	VRE 1-67	VNE 1-63	$E_{i,N}$	$E_{i,S}$	$E_{i,E}$	$E_{i,W}$	VE 1-85	VRE 1-67	VNE 1-63	VE 1-85	VRE 1-67	VNE 1-63	VRE 1-67	VNE 1-63		
0:00	57.4	60	-2.6	-19569.68	-17044.56	-15782	0.00	0.00	0.00	0.00	0	0	0	-19570	-17045	-15782	0	0		
1:00	55.6	60	-4.4	-33117.92	-28844.64	-26708	0.00	0.00	0.00	0.00	0	0	0	-33118	-28845	-26708	0	0		
2:00	53.5	60	-6.5	-48924.2	-42611.4	-39455	0.00	0.00	0.00	0.00	0	0	0	-48924	-42611	-39455	0	0		
3:00	51.8	60	-8.2	-61719.76	-53755.92	-49774	0.00	0.00	0.00	0.00	0	0	0	-61720	-53756	-49774	0	0		
4:00	50.0	60	-10.0	-75268	-65556	-60700	0.00	0.00	0.00	0.00	0	0	0	-75268	-65556	-60700	0	0		
5:00	49.3	60	-10.7	-80536.76	-70144.92	-64949	0.00	0.00	0.00	0.00	0	0	0	-80537	-70145	-64949	0	0		
6:00	49.7	70	-20.3	-142936.36	-133078.68	-123221	20.37	6.64	6.36	82.82	380956	275135	197533	238020	142056	74312	95964	163708		
7:00	51.0	70	-19.0	-133782.8	-124556.4	-115330	30.32	26.83	24.56	237.01	1055016	761956	547046	921234	637400	431716	283834	489518		
8:00	53.2	70	-16.8	-118292.16	-110134.08	-101976	39.07	76.13	37.67	274.01	1412627	1020231	732473	1294335	910097	630497	384238	663838		
9:00	56.0	70	-14.0	-98576.8	-91778.4	-84980	47.97	127.49	47.97	259.97	1597417	1153690	828290	1498840	1061912	743310	436929	755530		
10:00	58.2	70	-11.8	-83086.16	-77356.08	-71626	55.68	169.42	55.68	215.13	1635754	1181378	848169	1552668	1104022	776543	448646	776125		
11:00	60.3	70	-9.7	-68299.64	-63589.32	-58879	60.59	197.22	60.59	150.56	1543732	1114918	800454	1475432	1051328	741575	424104	733858		
12:00	63.0	70	-7.0	-49288.4	-45889.2	-42490	62.49	208.21	65.53	75.15	1351421	976026	700737	1302132	930137	658247	371995	643886		
13:00	65.7	70	-4.3	-30277.6	-28189.08	-26101	61.31	201.37	61.31	133.58	1505397	1087231	780576	1475120	1059042	754475	416078	720645		
14:00	68.0	70	-2.0	-14082.4	-13111.2	-12140	57.09	177.32	57.09	201.45	1625231	1173778	842712	1611149	1160667	830572	450482	780576		
15:00	69.3	70	-0.7	-4928.84	-4588.92	-4249	50.01	138.36	50.01	251.77	1619039	1169306	839502	1614110	1164717	835253	449393	778857		
16:00	69.8	70	-0.2	-1408.24	-1311.12	-1214	41.41	88.65	40.31	274.27	1470883	1062305	762680	1469475	1060994	761466	408482	780009		
17:00	69.0	70	-1.0	-7041.2	-6555.6	-6070	30.31	35.30	27.94	252.24	1145520	872320	593973	1138479	820764	587903	317714	550575		
18:00	67.8	70	-2.2	-15490.64	-14422.32	-13354	29.71	11.97	11.33	137.10	624691	451166	323914	609200	436743	310560	172457	298640		
19:00	66.3	70	-3.7	-26052.44	-24255.72	-22459	0.00	0.00	0.00	0.00	0	0	0	-26052	-24256	-22459	0	0		
20:00	64.4	70	-5.6	-39430.72	-36711.36	-33992	0.00	0.00	0.00	0.00	0	0	0	-39431	-36711	-33992	0	0		
21:00	62.6	60	2.6	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
22:00	60.5	60	0.5	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
23:00	59.0	60	-1.0	-7526.8	-6555.6	-6070	0.00	0.00	0.00	0.00	0	0	0	-7527	-6556	-6070	0	0		
													15808048	11194399	7816540	4660316	8063765			

May Fenestration Analysis

time	CONDUCTION = $Q_{cond} = UA(\Delta T)$						SOLAR RADIATION = $Q_{sol} = SHGC(A)(E_t)$						TOTAL ENERGY TRANSFER			SAVINGS (Cooling Only)				
	T_o	T_i	ΔT	VE 1-85	VRE 1-67	VNE 1-63	$E_{i,N}$	$E_{i,S}$	$E_{i,E}$	$E_{i,W}$	VE 1-85	VRE 1-67	VNE 1-63	VE 1-85	VRE 1-67	VNE 1-63	VRE 1-67	VNE 1-63		
0:00	62.8	60	2.8	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
1:00	61.0	60	1.0	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
2:00	58.8	60	-1.2	-9032.16	-7866.72	-7284	0.00	0.00	0.00	0.00	0	0	0	-9032	-7867	-7284	0	0		
3:00	56.8	60	-3.2	-24085.76	-20977.92	-19424	0.00	0.00	0.00	0.00	0	0	0	-24086	-20978	-19424	0	0		
4:00	55.5	60	-4.5	-33870.6	-29500.2	-27315	0.00	0.00	0.00	0.00	0	0	0	-33871	-29500	-27315	0	0		
5:00	55.4	60	-4.6	-34623.28	-30155.76	-27922	0.00	0.00	0.00	0.00	0	0	0	-34623	-30156	-27922	0	0		
6:00	56.2	70	-13.8	-97168.56	-90467.28	-83766	59.40	15.66	15.66	162.38	824700	595617	427622	727532	505149	343856	222382	383675		
7:00	57.9	70	-12.1	-85198.52	-79322.76	-73447	62.51	32.15	30.74	250.35	1234531	891606	640127	1149332	812283	566860	337049	582652		
8:00	59.9	70	-10.1	-71116.12	-66211.56	-61307	45.59	50.60	42.59	270.73	1354375	978160	702269	1283259	910948	640962	371311	642297		
9:00	62.0	70	-8.0	-56329.6	-52444.8	-48560	53.65	96.01	52.11	252.51	1500443	1083653	778008	1444114	1031209	729448	412905	714666		
10:00	64.0	70	-6.0	-42247.2	-39333.6	-36420	59.26	133.35	59.26	208.17	1571143	1095714	786667	1474895	1056381	750247	418515	724469		
11:00	65.9	70	-4.1	-28868.92	-26877.96	-24887	63.78	158.03	63.78	146.43	1421766	1026831	737212	1392897	999953	712325	392944	680572		
12:00	68.0	70	-2.0	-14082.4	-13111.2	-12140	65.47	167.44	68.84	75.09	1237621	893837	641729	1223539	880726	629589	342812	593949		
13:00	70.4	70	0.4	2816.48	2622.24	2428	64.24	160.62	64.24	135.42	1396573	1008636	724149	1399389	1011258	726577	388131	672812		
14:00	72.5	70	2.5	17603	16389	15175	60.17	138.25	60.17	199.22	1509323	1090066	782612	1526926	1106455	797787	420470	729139		
15:00	74.0	70	4.0	28164.8	26222.4	24280	54.77	102.70	53.43	246.90	1511669	1091761	783829	1539834	1117984	808109	421851	731276		
16:00	74.9	70	4.9	34501.88	32122.44	29743	47.02	58.18	44.27	269.99	1387007	1001727	719189	1421508	1033849	748932	387659	672577		
17:00	74.6	70	4.6	32389.52	30155.76	27922	59.90	34.53	32.82	257.04	1264139	912989	655479	1296528	943145	683401	353383	613127		
18:00	73.6	70	3.6	25348.32	23600.16	21852	63.43	18.41	18.41	183.62	926245	668955	480275	951593	625555	502127	259038	449466		
19:00	72.0	70	2.0	14082.4	13111.2	12140	2.27	0.36	0.36	4.66	24779	17896	12848	38861	31007	24988	7854	13873		
20:00	70.2	70	0.2	1408.24	1311.12	1214	0.00	0.00	0.00	0.00	0	0	0	1408	1311	1214	97	194		
21:00	68.1	60	8.1	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
22:00	66.0	60	6.0	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
23:00	64.5	60	4.5	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
													16770005	12046713	8584296	4736403	8205375			

June Fenestration Analysis

time	CONDUCTION = $Q_{cond} = UA(\Delta T)$						SOLAR RADIATION = $Q_{sol} = SHGC(A)(E_t)$						TOTAL ENERGY TRANSFER			SAVINGS (Cooling Only)		
	T_o	T_i	ΔT	VE 1-85	VRE 1-67	VNE 1-63	$E_{i,N}$	$E_{i,S}$	$E_{i,E}$	$E_{i,W}$	VE 1-85	VRE 1-67	VNE 1-63	VE 1-85	VRE 1-67	VNE 1-63	VRE 1-67	VNE 1-63
0:00	72.6	78	-5.4	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0
1:00	70.8	78	-7.2	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0
2:00	68.7	78	-9.3	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0
3:00	67.0	78	-11.0	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0
4:00	65.8	78	-12.2	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0
5:00	65.8	78	-12.2	0	0	0	1.33	0.19	0.19	2.27	12841	9274	6658	12841	9274	6658	3567	6183
6:00	66.7	70	-3.3	-23235.96	-21633.48	-20031	71.48	17.30	17.30	166.00	883867	638348	458301	860631	616715	438270	243916	422361
7:00	68.0	70	-2.0	-14082.4	-13111.2	-12140	76.68	32.64	31.76	244.95	1263862	912790	655336	1249780	896878	643196	350102	608584
8:00	69.9	70	-0.1	-704.12	-655.56	-607	57.79	46.06	43.31	264.98	1359137	981599	704738	1358433	980944	704131	377490	654302
9:00	71.8	70	1.8	12674.16	11800.08	10926	55.07	78.63	52.66	248.94	1437505	1039198	745373	1450179	1049998	756299	400181	693880
10:00	73.5	70	3.5	24844.2	22944.6	21245	60.96	114.89	59.75	207.69	1461009	1055173	757560	1485653	1078118	778805	407535	708848
11:00																		



July Fenestration Analysis

time	CONDUCTION = $Q_{cond} = UA(\Delta T)$						SOLAR RADIATION = $Q_{sol} = SHGC(A)(E_t)$						TOTAL ENERGY TRANSFER			SAVINGS (Cooling Only)				
	T_o	T_i	ΔT	VE 1-85	VRE 1-67	VNE 1-63	$E_{i,N}$	$E_{i,S}$	$E_{i,E}$	$E_{i,W}$	VE 1-85	VRE 1-67	VNE 1-63	VE 1-85	VRE 1-67	VNE 1-63	VRE 1-67	VNE 1-63		
0:00	78.7	78	0.7	5268.76	4588.92	4249	0.00	0.00	0.00	0.00	0	0	0	5269	4589	4249	680	1020		
1:00	77.1	78	-0.9	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
2:00	75.2	78	-2.8	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
3:00	73.7	78	-4.3	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
4:00	72.4	78	-5.6	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
5:00	72.0	78	-6.0	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
6:00	72.7	70	2.7	19011.24	17700.12	16389	53.68	13.11	13.11	134.86	698585	504534	362229	717697	522234	378618	195363	338978		
7:00	74.0	70	4.0	28164.8	26222.4	24280	65.77	30.00	28.91	236.28	1183749	854930	613796	1221194	881153	638076	330762	573838		
8:00	75.8	70	5.8	40838.96	38022.48	35206	47.56	44.24	41.10	264.86	1314523	949378	681605	1355362	987400	716811	367962	638552		
9:00	77.8	70	7.8	54921.36	51133.68	47346	52.84	86.19	50.91	252.70	1462143	1055993	758148	1517065	1107126	805494	409939	711570		
10:00	79.5	70	9.5	66891.4	62278.2	57665	58.38	124.28	58.38	213.14	1498212	1082042	776850	1565103	1144320	834515	420783	730588		
11:00	81.0	70	11.0	77453.2	72111.6	66770	63.27	150.62	63.27	155.12	1423113	1027804	737911	1500567	1099916	804681	400651	695886		
12:00	82.9	70	12.9	90831.48	84567.24	78303	65.40	162.31	68.29	86.45	1256473	907453	651505	1347305	992020	729808	355285	617497		
13:00	84.8	70	14.8	104209.76	97022.88	89836	64.64	158.14	65.78	123.20	1354286	978095	702222	1458495	1075118	792058	383377	666437		
14:00	86.5	70	16.5	116179.8	108167.4	100155	61.05	138.54	61.05	187.26	1476118	1066085	765395	1592298	1174253	865550	418045	726748		
15:00	88.0	70	18.0	126741.6	118000.8	109260	56.09	105.58	54.78	236.64	1495636	1080182	775515	1622378	1198183	884775	424195	737603		
16:00	88.8	70	18.8	132374.56	123245.28	114116	48.78	63.14	46.07	263.64	1392058	1005375	721808	1524432	1128620	835924	395812	688509		
17:00	88.7	70	18.7	131670.44	122589.72	113509	58.76	37.05	35.06	256.26	1274311	920336	660754	1405981	1042925	774263	363056	631719		
18:00	87.8	70	17.8	125333.36	116688.68	108046	66.20	21.28	21.28	196.16	995817	719201	516350	1121151	835891	624396	285260	496755		
19:00	86.7	70	16.7	117588.04	109478.52	101369	15.80	2.87	2.87	33.35	177753	128377	92168	295341	237856	193537	57485	101804		
20:00	85.0	70	15.0	105818.8	98334	91050	0.00	0.00	0.00	0.00	0	0	0	105618	98334	91050	7284	14568		
21:00	83.3	78	5.3	39892.04	34744.68	32171	0.00	0.00	0.00	0.00	0	0	0	39892	34745	32171	5147	7721		
22:00	81.6	78	3.6	27096.48	23600.16	21852	0.00	0.00	0.00	0.00	0	0	0	27096	23600	21852	3496	5244		
23:00	80.1	78	2.1	15806.28	13766.76	12747	0.00	0.00	0.00	0.00	0	0	0	15806	13767	12747	2040	3059		
													18428671	13602049	10040575	4826621	8388096			

August Fenestration Analysis

time	CONDUCTION = $Q_{cond} = UA(\Delta T)$						SOLAR RADIATION = $Q_{sol} = SHGC(A)(E_t)$						TOTAL ENERGY TRANSFER			SAVINGS (Cooling Only)				
	T_o	T_i	ΔT	VE 1-85	VRE 1-67	VNE 1-63	$E_{i,N}$	$E_{i,S}$	$E_{i,E}$	$E_{i,W}$	VE 1-85	VRE 1-67	VNE 1-63	VE 1-85	VRE 1-67	VNE 1-63	VRE 1-67	VNE 1-63		
0:00	78.9	78	0.9	6774.12	5900.04	5463	0.00	0.00	0.00	0.00	0	0	0	6774	5900	5463	874	1311		
1:00	77.4	78	-0.6	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
2:00	75.7	78	-2.3	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
3:00	74.0	78	-4.0	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
4:00	72.8	78	-5.2	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
5:00	72.0	78	-6.0	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0		
6:00	72.2	70	2.2	15490.64	14422.32	13354	17.26	5.49	5.30	64.28	302356	218368	156777	317847	232790	170131	85056	147715		
7:00	73.3	70	3.3	23235.96	21633.48	20031	33.18	26.06	23.94	220.70	1004464	725446	520833	1027700	747080	540864	280620	486836		
8:00	75.0	70	5.0	35206	32778	30350	39.04	69.53	37.36	263.63	1355104	978686	702646	1390310	1011464	732996	378846	657313		
9:00	77.2	70	7.2	50696.64	47200.32	43704	47.81	119.61	47.81	254.23	1551255	1120351	804354	1601951	1167551	848058	434400	753893		
10:00	79.3	70	9.3	65483.16	60967.08	56451	55.62	161.10	55.62	213.27	1601850	1156892	830589	1667334	1217859	887040	449475	780293		
11:00	81.0	70	11.0	77453.2	72111.6	66770	60.66	189.14	60.66	152.11	1522751	1099765	789575	1600205	1171877	856345	428328	738860		
12:00	83.1	70	13.1	92239.72	85878.36	79517	62.72	200.88	65.75	79.73	1344081	970725	696931	1436320	1056603	776448	379717	659373		
13:00	85.5	70	15.5	109138.6	101611.8	94085	61.73	195.20	61.73	127.57	1467826	1060096	761095	1576964	1161708	855180	415256	721784		
14:00	87.5	70	17.5	123221	114723	106225	57.72	172.65	57.72	193.64	1587928	1146837	823370	1711149	1261560	929595	449589	781554		
15:00	88.8	70	18.8	132374.56	123245.28	114116	50.85	135.44	50.85	242.79	1584931	1144672	821816	1717306	1267918	935932	449388	781374		
16:00	89.2	70	19.2	135191.04	125867.52	116544	42.52	87.64	41.32	264.86	1443080	1042224	748264	1578271	1168092	864808	410179	713463		
17:00	88.7	70	18.7	131670.44	122589.72	113509	31.60	36.23	29.06	244.01	1128932	815340	585372	1260603	937930	698881	322673	561721		
18:00	87.6	70	17.6	123925.12	115378.56	106832	31.25	13.36	12.65	139.02	644881	465747	334383	768806	581126	441215	187680	327591		
19:00	86.4	70	16.4	115475.68	107511.84	99548	0.00	0.00	0.00	0.00	0	0	0	115476	107512	99548	7964	15928		
20:00	84.9	70	14.9	104913.88	97678.44	90443	0.00	0.00	0.00	0.00	0	0	0	104914	97678	90443	7235	14471		
21:00	83.2	78	5.2	39139.36	34089.12	31564	0.00	0.00	0.00	0.00	0	0	0	39139	34089	31564	5050	7575		
22:00	81.5	78	3.5	26343.8	22944.6	21245	0.00	0.00	0.00	0.00	0	0	0	26344	22945	21245	3399	5099		
23:00	80.2	78	2.2	16558.96	14422.32	13354	0.00	0.00	0.00	0.00	0	0	0	16559	14422	13354	2137	3205		
													17963971	13266104	9799110	4697867	8164860			

September Fenestration Analysis

time	CONDUCTION = $Q_{cond} = UA(\Delta T)$						SOLAR RADIATION = $Q_{sol} = SHGC(A)(E_t)$						TOTAL ENERGY TRANSFER			SAVINGS (Cooling Only)		
	T_o	T_i	ΔT	VE 1-85	VRE 1-67	VNE 1-63	$E_{i,N}$	$E_{i,S}$	$E_{i,E}$	$E_{i,W}$	VE 1-85	VRE 1-67	VNE 1-63	VE 1-85	VRE 1-67	VNE 1-63	VRE 1-67	VNE 1-63
0:00	66.4	60	6.4	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0
1:00	65.3	60	5.3	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0
2:00	64.0	60	4.0	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0
3:00	62.8	60	2.8	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0
4:00	61.7	60	1.7	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0
5:00	60.9	60	0.9	0	0	0	0.00	0.00	0.00	0.00	0	0	0	0	0	0	0	0
6:00	60.7	70	-9.3	-65483.16	-60967.08	-56451	0.00	0.00	0.00	0.00	0	0	0	-65483	-60967	-56451	0	0
7:00	61.4	70	-8.6	-60554.32	-56378.16	-52202	16.92	44.22	16.22	179.68	851901	615262	441726	791346	588883	389524	232463	401822
8:00	62.9	70	-7.1	-49992.52	-46544.76	-43097	31.13	110.17	31.13	249.80	1397203	1009091	724476	1347211	962547	681379	384664	665832
9:00	65.0	70	-5.0	-35206	-32778	-30350	42.00	168.21	42.00	244.09	1639628	1184176	850177	1604422	1151398	819827	453024	784594
10:00	67.0	70	-3.0	-21123.6	-19666.8	-18210	49.85	213.24	49.85	201.08	1695238	1224338	879012	1674114	1204671	868082	469443	813312
11:00	68.7	7																



October Fenestration Analysis

time	CONDUCTION = $Q_{cond} = UA(\Delta T)$						SOLAR RADIATION = $Q_{sol} = SHGC(A)(E_s)$						TOTAL ENERGY TRANSFER			SAVINGS (Cooling Only)		
	T_o	T_i	ΔT	VE 1-85	VRE 1-67	VNE 1-63	E_{tN}	E_{tS}	E_{tE}	E_{tW}	VE 1-85	VRE 1-67	VNE 1-63	VE 1-85	VRE 1-67	VNE 1-63	VRE 1-67	VNE 1-63
0:00	55.5	60	-4.5	-33870.6	-32778	-31685	0.00	0.00	0.00	0.00	0	0	0	-33871	-32778	-31685	0	0
1:00	54.2	60	-5.8	-43655.44	-42247.2	-40839	0.00	0.00	0.00	0.00	0	0	0	-43655	-42247	-40839	0	0
2:00	52.9	60	-7.1	-53440.28	-51716.4	-49993	0.00	0.00	0.00	0.00	0	0	0	-53440	-51716	-49993	0	0
3:00	51.4	60	-8.6	-64730.48	-62642.4	-60554	0.00	0.00	0.00	0.00	0	0	0	-64730	-62642	-60554	0	0
4:00	50.1	60	-9.9	-74515.32	-72111.6	-69708	0.00	0.00	0.00	0.00	0	0	0	-74515	-72112	-69708	0	0
5:00	49.0	60	-11.0	-82794.8	-80124	-77453	0.00	0.00	0.00	0.00	0	0	0	-82795	-80124	-77453	0	0
6:00	48.5	70	-21.5	-161826.2	-156606	-151386	0.00	0.00	0.00	0.00	0	0	0	-161826	-156606	-151386	0	0
7:00	48.7	70	-21.3	-160320.84	-155149.2	-149978	7.26	37.28	7.26	95.31	487493	352078	252774	327172	196929	102796	130243	224375
8:00	50.4	70	-19.6	-147525.28	-142766.4	-138008	24.13	131.86	24.13	217.13	1314252	949182	681464	1166727	806416	543456	360311	623270
9:00	53.1	70	-16.9	-127202.92	-123099.6	-118996	35.36	199.55	35.36	222.06	1626120	1174420	843173	1498917	1051320	724177	447597	774740
10:00	56.3	70	-13.7	-103117.16	-99790.8	-96464	43.12	247.75	43.12	181.63	1700148	1227885	881558	1597031	1128094	785094	468937	811937
11:00	59.0	70	-11.0	-82794.8	-80124	-77453	47.65	276.34	47.65	117.71	1610467	1163115	835057	1527672	1082991	757604	444681	770068
12:00	62.5	70	-7.5	-56451	-54630	-52809	48.91	284.29	51.65	61.40	1466627	1059231	760473	1410176	1004601	707664	405575	702512
13:00	65.0	70	-5.0	-37634	-36420	-35206	46.85	271.26	46.85	134.65	1645051	1188092	852989	1607417	1151672	817783	455745	789633
14:00	66.2	70	-3.8	-28601.84	-26757.2	-26757	41.53	237.81	41.53	194.18	1699012	1227064	880969	1670410	1199385	854213	471025	816197
15:00	66.0	70	-4.0	-30107.2	-29136	-28165	32.98	184.98	32.98	226.31	1576957	1138913	817681	1546850	1109777	789517	437072	757333
16:00	65.3	70	-4.7	-35375.96	-34234.8	-33094	20.74	112.02	20.74	203.68	1182092	853733	612937	1146716	819498	579843	327218	566873
17:00	64.2	70	-5.8	-43655.44	-42247.2	-40839	2.15	10.78	2.15	31.26	153615	110944	79652	109960	66967	38813	41263	71146
18:00	63.0	70	-7.0	-52687.6	-50988	-49288	0.00	0.00	0.00	0.00	0	0	0	-52688	-50988	-49288	0	0
19:00	61.8	70	-8.2	-61719.76	-59728.8	-57738	0.00	0.00	0.00	0.00	0	0	0	-61720	-59729	-57738	0	0
20:00	60.5	70	-9.5	-71504.6	-69198	-66891	0.00	0.00	0.00	0.00	0	0	0	-71505	-69198	-66891	0	0
21:00	59.0	60	-1.0	-7526.8	-7284	-7041	0.00	0.00	0.00	0.00	0	0	0	-7527	-7284	-7041	0	0
22:00	57.7	60	-2.3	-17311.64	-16753.2	-16195	0.00	0.00	0.00	0.00	0	0	0	-17312	-16753	-16195	0	0
23:00	56.6	60	-3.4	-25591.12	-24765.6	-23940	0.00	0.00	0.00	0.00	0	0	0	-25591	-24766	-23940	0	0
													1285782	8892437	5998249	3989667	6908087	

November Fenestration Analysis

time	CONDUCTION = $Q_{cond} = UA(\Delta T)$						SOLAR RADIATION = $Q_{sol} = SHGC(A)(E_s)$						TOTAL ENERGY TRANSFER			SAVINGS (Cooling Only)		
	T_o	T_i	ΔT	VE 1-85	VRE 1-67	VNE 1-63	E_{tN}	E_{tS}	E_{tE}	E_{tW}	VE 1-85	VRE 1-67	VNE 1-63	VE 1-85	VRE 1-67	VNE 1-63	VRE 1-67	VNE 1-63
0:00	48.4	60	-11.6	-87310.88	-84494.4	-81678	0.00	0.00	0.00	0.00	0	0	0	-87311	-84494	-81678	0	0
1:00	47.4	60	-12.6	-94837.68	-91778.4	-88719	0.00	0.00	0.00	0.00	0	0	0	-94838	-91778	-88719	0	0
2:00	46.1	60	-13.9	-104622.52	-101247.6	-97873	0.00	0.00	0.00	0.00	0	0	0	-104623	-101248	-97873	0	0
3:00	45.0	60	-15.0	-112902	-109260	-105618	0.00	0.00	0.00	0.00	0	0	0	-112902	-109260	-105618	0	0
4:00	44.0	60	-16.0	-120428.8	-116544	-112659	0.00	0.00	0.00	0.00	0	0	0	-120429	-116544	-112659	0	0
5:00	43.3	60	-16.7	-125697.56	-121642.8	-117588	0.00	0.00	0.00	0.00	0	0	0	-125698	-121643	-117588	0	0
6:00	43.0	70	-27.0	-203223.6	-196668	-190112	0.00	0.00	0.00	0.00	0	0	0	-203224	-196668	-190112	0	0
7:00	44.0	70	-26.0	-195696.8	-189384	-183071	0.00	0.00	0.00	0.00	0	0	0	-195697	-189384	-183071	0	0
8:00	46.5	70	-23.5	-176879.8	-171174	-165468	14.39	111.57	14.39	151.19	964382	696498	500050	787502	525324	334582	262178	452920
9:00	49.6	70	-20.4	-153546.72	-148593.6	-143640	26.99	202.26	26.99	191.31	1478176	1067572	766462	1324630	918978	622821	405661	701808
10:00	52.5	70	-17.5	-131719	-127470	-123221	35.13	258.61	35.13	163.57	1623783	1127332	841962	1492064	1045262	718741	446802	773324
11:00	56.0	70	-14.0	-105375.2	-101976	-98577	39.81	290.64	39.81	106.85	1570418	1134191	814291	1465043	1032215	715714	432828	749329
12:00	58.0	70	-12.0	-90321.6	-87408	-84494	41.17	299.85	43.82	50.92	1432290	1034431	742669	1341968	947023	658174	394945	683794
13:00	58.4	70	-11.6	-87310.88	-84494.4	-81678	39.18	286.34	39.18	118.96	1592551	1150176	825767	1505240	1065681	744089	439559	761151
14:00	58.0	70	-12.0	-90321.6	-87408	-84494	33.86	249.91	33.86	171.71	1614092	1165733	836937	1523771	1078325	752442	445445	771328
15:00	57.3	70	-12.7	-95590.36	-92506.8	-89423	25.02	188.37	25.02	190.99	1418652	1024582	735597	1323062	932075	646174	390986	676888
16:00	56.4	70	-13.6	-102364.48	-99062.4	-95760	11.20	87.66	11.20	127.14	784846	566833	406957	682482	467771	311197	214711	371285
17:00	55.4	70	-14.6	-109891.28	-106346.4	-102802	0.00	0.00	0.00	0.00	0	0	0	-109891	-106346	-102802	0	0
18:00	54.3	70	-15.7	-118170.76	-114358.8	-110547	0.00	0.00	0.00	0.00	0	0	0	-118171	-114359	-110547	0	0
19:00	53.3	70	-16.7	-125697.56	-121642.8	-117588	0.00	0.00	0.00	0.00	0	0	0	-125698	-121643	-117588	0	0
20:00	52.2	70	-17.8	-133977.04	-129655.2	-125333	0.00	0.00	0.00	0.00	0	0	0	-133977	-129655	-125333	0	0
21:00	51.1	60	-8.9	-66988.52	-64827.6	-62667	0.00	0.00	0.00	0.00	0	0	0	-66989	-64828	-62667	0	0
22:00	50.2	60	-9.8	-73762.64	-71383.2	-69004	0.00	0.00	0.00	0.00	0	0	0	-73763	-71383	-69004	0	0
23:00	49.3	60	-10.7	-80536.76	-77938.8	-75341	0.00	0.00	0.00	0.00	0	0	0	-80537	-77939	-75341	0	0
													9692017	6315484	3863335	3433105	5941826	

December Fenestration Analysis

time	CONDUCTION = $Q_{cond} = UA(\Delta T)$						SOLAR RADIATION = $Q_{sol} = SHGC(A)(E_s)$						TOTAL ENERGY TRANSFER			SAVINGS (Cooling Only)		
	T_o	T_i	ΔT	VE 1-85	VRE 1-67	VNE 1-63	E_{tN}	E_{tS}	E_{tE}	E_{tW}	VE 1-85	VRE 1-67	VNE 1-63	VE 1-85	VRE 1-67	VNE 1-63	VRE 1-67	VNE 1-63
0:00	41.9	60	-18.1	-136235.08	-131840.4	-127446	0.00	0.00	0.00	0.00	0	0	0	-136235	-131840	-127446	0	0
1:00	40.8	60	-19.2	-144514.56	-139852.8	-135191	0.00	0.00	0.00	0.00	0	0	0	-144515	-139853	-135191	0	0
2:00	39.5	60	-20.5	-154299.4	-149322	-144345	0.00	0.00	0.00	0.00	0	0	0	-154299	-149322	-144345	0	0
3:00	38.3	60	-21.7	-163331.56	-158062.8	-152794	0.00	0.00	0.00	0.00	0	0	0	-163332	-158063	-152794	0	0
4:00	37.0	60	-23.0	-173116.4	-167532	-161948	0.00	0.00	0.00	0.00	0	0	0	-173116	-167532	-161948	0	0
5:00	36.1	60	-23.9	-179890.52	-174087.6	-168285	0.00	0.00	0.00	0.00	0	0	0	-179891	-174088	-168285	0	0
6:00	35.7	70	-34.3	-258169.24	-249841.2	-241513	0.00	0.00	0.00	0.00	0	0	0	-258169	-249841	-241513	0	0
7:00	36.0	70	-34.0	-255911.2	-247656	-239401	0.00	0.00	0.00	0.00	0	0	0	-255911	-247656	-239401	0	0
8:00	38.1	70	-31.9	-240104.92	-232359.6	-224614	5.94	54.53	5.94	73.31	462325	333902	239724	222220	101542	15110	120678	207110
9:00	42.0	70	-28.0	-210750.4	-203952	-197154	21.00	179.19	21.00	170.53	1294116	934640	671023	1083366	730688	473870	352678	609496
10:00	45.5	70	-24.5	-184406.6	-178458	-172509	30.18	248.04										