Table A8.1 Total solar irradiance (W/m²) on vertical and horizontal surfaces for SE England. (Approximately correct for UK.)

51·7°N

Date	Orientation	Daily mean	Sun Time 04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20
June 21	N	90	35	155	165	105	100	125	145	160	165	160	145	125	100	105	165	155	35
	NE	135	60	305	445	465	420	320	195	170	175	170	155	130	105	75	50	20	5
	E	185	50	295	495	600	625	585	490	355	185	180	165	140	110	80	50	25	5
	SE	180	10	120	280	420	525	580	585	535	430	290	165	140	110	80	50	25	5
	S	155	5	25	50	80	185	320	435	510	535	510	435	320	185	80	50	25	5
	SW	180	5	25	50	80	110	140	165	290	430	535	585	580	525	420	280	120	10
	W	185	5	25	50	80	100	140	165	180	185	355	490	585	625	600	495	295	50
	NW	135	5	20	50	75	105	130	155	170	175	170	195	320	420	465	445	305	60
	H	315	5	80	210	360	505	640	750	825	850	825	750	640	505	360	210	80	5
July 23 and May 22	N	85		100	130	90	110	140	165	180	185	180	165	140	110	90	130	100	
	NE	125		210	370	410	380	300	195	195	200	195	175	145	115	80	50	20	
	E	175		210	420	540	580	555	480	360	215	205	185	155	125	90	55	20	
	SE	180		95	255	400	510	570	580	540	450	320	185	155	125	90	55	20	
	S	165		20	55	90	210	340	450	525	550	525	450	340	210	90	55	20	
	SW	180		20	55	90	125	155	185	320	450	540	580	570	510	400	255	95	
	W	175		20	55	90	125	155	185	205	215	360	480	555	580	540	420	210	
	NW	125		20	50	80	115	145	175	195	200	195	195	300	380	410	370	210	
	H	295		55	180	325	470	605	715	785	815	785	715	605	470	325	180	55	
August 22 and April 22	N	60		5	60	60	90	120	145	160	165	160	145	120	90	60	60	5	
	NE	95		10	240	330	315	240	155	170	180	170	155	125	95	65	30	0	
	E	145		10	295	475	545	535	460	340	190	185	165	135	105	65	30	0	
	SE	175		5	190	380	510	585	600	565	470	340	185	135	105	65	30	0	
	S	175		0	30	95	235	375	490	565	590	565	490	375	235	95	30	0	
	SW	175		0	30	65	105	135	185	340	470	565	600	585	510	380	190	5	
	W	145		0	30	65	105	135	165	185	190	340	460	535	545	475	295	10	
	NW	95		0	30	65	95	125	155	170	180	170	155	240	315	330	240	10	
	H	240		0	90	225	375	510	620	690	715	690	620	510	375	225	90	0	
Sept 22 and March 21	N	40			0	30	60	90	115	130	135	130	115	90	60	30	0		
	NE	60			0	205	235	165	125	140	145	140	125	100	65	30	0		
	E	120			0	340	515	535	465	330	155	150	130	105	70	35	0		
	SE	175			0	295	525	650	685	665	545	395	215	105	70	35	0		
	S	200			0	95	270	445	585	675	710	675	585	445	270	95	0		
	SW	175			0	35	70	105	215	395	545	665	685	650	525	295	0		
	W	120			0	35	70	105	130	150	155	330	465	535	515	340	0		
	NW	60			0	30	65	100	125	140	145	140	125	165	235	205	0		
	H	180			0	95	245	395	515	595	625	595	515	395	245	95	0		
Oct 22 and Feb 21	N	30				0	30	60	90	105	110	105	90	60	30	0			
	NE	35				10	105	80	95	110	120	110	95	65	30	0			
	E	75				25	290	395	370	265	125	120	100	70	35	0			
	SE	135				20	320	515	590	580	500	370	215	70	35	0			
	S	170				10	185	380	530	620	655	620	530	380	185	10			
	SW	135				0	35	70	215	370	500	580	590	515	320	20			
	W	75				0	35	70	100	120	125	265	370	395	290	25			
	NW	35				0	30	65	95	110	120	110	95	80	105	10			
	H	110				5	100	230	340	415	440	415	340	230	100	5			
Nov 22 and Jan 21	N	15					5	30	55	70	75	70	55	30	5				
	NE	20					15	35	60	75	80	75	60	35	5				
	E	40					45	230	265	200	90	80	65	35	5				
	SE	100					55	325	470	495	440	325	180	50	5				
	S	130					35	250	435	545	585	545	435	250	35				
	SW	100					5	50	180	325	440	495	470	325	55				
	W	40					5	35	65	80	90	200	265	230	45				
	NW	20					5	35	60	75	80	75	60	35	15				
	H	60					10	95	190	260	285	260	190	95	10				
Dec 21	N	10						15	40	50	55	50	40	15					
	NE	10						20	40	55	60	55	40	20					
	E	30						155	225	175	65	60	45	20					
	SE	85						230	410	460	410	300	155	35					
	S	115						180	385	510	555	510	385	180					
	SW	85						35	155	300	410	460	410	230					
	W	30						20	45	60	65	175	225	155					
	NW	10						20	40	55	60	55	40	20					
	H	40						50	130	195	220	195	130	50					

Notes:

1. N, NE, E etc: total irradiance on vertical surfaces.
   H: total irradiance on horizontal surface.
2. This table is based on horizontal surface measurements at Kew for the period 1959-1968: weather for two consecutive days averaged. See Section A2, Table A2.27.
3. For other latitudes see Section A2, *Basic Radiation Data - World Values.*

Table A8.2 Mean solar gain factors, $\bar{S}_e$, for various types of glazing and shading (strictly accurate for UK only, approximately correct world wide).

Position of shading and type of sun protection		Mean solar gain factors*, $\bar{S}_e$, for stated window type	
Shading	Type of sun protection	Single	Double
None	None	0·76	0·64
	Lightly heat absorbing glass	0·51	0·38
	Densely heat absorbing glass	0·39	0·25
	Lacquer coated glass, grey	0·56	—
	Heat reflecting glass, gold (sealed unit when double)	0·26	0·25
Internal	Dark green open weave plastic blind	0·62	0·56
	White venetian blind	0·46	0·46
	White cotton curtain	0·41	0·40
	Cream holland linen blind	0·30	0·33
Mid-pane	White venetian blind	—	0·28
External	Dark green open weave plastic blind	0·22	0·17
	Canvas roller blind	0·14	0·11
	White louvred sunbreaker, blades at 45°	0·14	0·11
	Dark green miniature louvred blind	0·13	0·10

Notes: *All glazing clear except where stated otherwise. Factors are typical values only and variations will occur due to density of blind weave, reflectivity and cleanliness of protection.

Table A8.3 Sol-air and outside air temperatures for SE England – 2½% day of highest radiation. (Approximately correct for UK. See Section A2, *Sol-air Temperature and Long-wave Loss.*)

(f) August 22

Sun Time	Air Temp., t_{ao}/(°C)	Sol-air temperature, t_{eo}/(°C)																	
		Horizontal		North		North-East		East		South-East		South		South-West		West		North-West	
		Dark	Light	Dark	Light	Dark	Light	Dark	Light	Dark	Light	Dark	Light	Dark	Light	Dark	Light	Dark	Light
00	15.0	12.0	12.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
01	14.0	11.0	11.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0	13.0
02	13.0	10.0	10.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
03	12.5	9.5	9.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5	11.5
04	12.0	9.0	9.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
05	12.0	9.0	8.5	11.0	11.0	11.5	11.0	11.5	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
06	12.0	12.5	11.0	13.5	12.5	21.0	16.5	23.0	17.5	19.0	15.5	12.5	12.0	12.5	12.0	12.5	12.0	12.5	12.0
07	12.5	18.5	14.5	14.0	13.0	25.0	19.0	31.0	22.5	27.0	20.0	15.5	14.0	14.5	13.0	14.5	13.0	14.0	13.0
08	13.5	25.5	19.0	16.0	14.5	25.5	19.5	34.5	25.0	33.0	24.0	22.0	18.0	17.0	15.0	17.0	15.0	16.5	14.5
09	14.5	32.0	23.0	18.5	16.5	23.5	19.0	35.5	26.0	37.5	27.0	29.0	22.0	19.5	17.0	19.5	17.0	19.0	16.5
10	16.0	38.0	27.0	21.0	18.5	21.5	18.5	33.5	25.5	39.5	28.5	35.0	26.0	22.5	19.0	21.5	19.0	21.5	18.5
11	17.5	42.5	30.0	23.0	20.0	23.5	20.5	30.5	24.0	39.5	29.0	39.5	29.0	30.5	24.0	24.0	20.5	23.5	20.5
12	18.5	44.5	32.0	24.5	21.5	25.0	22.0	25.5	22.0	37.0	28.5	41.5	31.0	37.0	28.5	25.5	22.0	25.0	22.0
13	20.0	45.0	32.5	25.5	22.5	26.0	23.0	26.5	23.0	33.0	26.5	42.0	31.5	42.0	31.5	33.0	26.5	26.0	23.0
14	21.0	43.0	31.5	26.0	23.0	26.0	23.5	26.5	23.5	27.5	24.0	39.5	31.0	44.5	33.5	38.5	30.5	26.0	23.5
15	21.5	39.0	30.0	25.5	23.0	25.5	23.5	26.0	23.5	26.0	23.5	35.5	29.0	44.0	33.5	42.0	32.5	30.0	26.0
16	21.5	33.5	27.0	24.5	22.5	24.5	23.0	25.0	23.0	25.0	23.0	30.5	26.0	41.5	32.0	43.0	33.0	33.5	28.0
17	21.5	27.5	23.5	23.0	22.0	23.0	22.0	23.0	22.0	23.0	22.0	24.5	22.5	36.0	29.0	40.0	31.5	34.0	28.0
18	21.0	21.5	20.0	22.5	21.5	21.5	21.0	21.5	21.0	21.5	21.0	21.5	21.0	28.0	24.5	32.0	26.5	30.0	25.5
19	20.5	17.5	17.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	19.5	20.0	19.5	20.0	19.5
20	19.5	16.5	16.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
21	18.5	15.5	15.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5	17.5
22	17.0	14.0	14.0	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5	16.5
23	16.0	13.0	13.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0
Mean	16.5	23.5	19.0	18.0	17.0	19.5	18.0	22.0	19.0	23.0	19.5	23.0	19.5	23.0	19.5	22.0	19.0	19.5	18.0

Note: I_f (horizontal surface) = 76 W/m², I_f (vertical surface) = 17 W/m²

Table A8.4 Ventilation rates for naturally ventilated buildings on sunny days.

Position of opening windows	Usage of windows		Effective mean ventilation rate	
	Day	Night	Air changes (h^{-1})	Ventilation allowance ($W/m^3 K$)
One side only	Closed	Closed	1	0·3
	Open	Closed	3	1·0
	Open	Open	10	3·3
More than one side	Closed	Closed	2	0·6
	Open	Closed	10	3·3
	Open	Open	30	10·0

Table A8.6 Alternating solar gain factors, $\bar{S}_{\alpha}$, for various types of glazing and shading, lightweight and heavyweight structures (strictly accurate for UK only – SW façade).

Position of shading and type of sun protection		Alternating solar gain factors*, $\bar{S}_{\alpha}$, for the following building and window types			
		Heavyweight building		Lightweight building	
Shading	Type of sun protection	Single	Double	Single	Double
None	None	0·42	0·39	0·65	0·56
	Lightly heat absorbing glass	0·36	0·27	0·47	0·35
	Densely heat absorbing glass	0·32	0·21	0·37	0·24
	Lacquer coated glass, grey	0·37	—	0·50	—
	Heat reflecting glass, gold (sealed unit when double)	0·21	0·14	0·25	0·20
Internal	Dark green open weave plastic blind	0·55	0·53	0·61	0·57
	White venetian blind	0·42	0·44	0·45	0·46
	White cotton curtain	0·27	0·31	0·35	0·37
	Cream holland linen blind	0·24	0·30	0·27	0·32
Mid-pane	White venetian blind	—	0·24	—	0·27
External	Dark green open weave plastic blind	0·16	0·13	0·22	0·17
	Canvas roller blind	0·10	0·08	0·13	0·10
	White louvred sunbreaker, blades at 45°	0·08	0·06	0·11	0·08
	Dark green miniature louvred blind	0·08	0·06	0·10	0·07

Notes: *All glazing clear except where stated otherwise. Factors are typical values only and variations will occur due to density of blind weave, reflectivity and cleanliness of protection.