

Predicted clear day beam and diffuse irradiances ( $/W\cdot m^{-2}$ ) on vertical and horizontal surfaces on specified days in northern (N) and southern (S) hemispheres (see notes at foot of table): LATITUDE 40° N/S

Date and times of sunrise/sunset	Orientation	Type	Daily mean irradiance ( $/W\cdot m^{-2}$ ) and mean hourly irradiance ( $/W\cdot m^{-2}$ ) for stated solar time*																		
			Mean	0330	0430	0530	0630	0730	0830	0930	1030	1130	1230	1330	1430	1530	1630	1730	1830	1930	2030
Jan 29 (N) / Jul 3 (S)																					
	Normal to beam		241	—	—	—	—	230	512	659	735	769	769	735	659	512	230	—	—	—	—
Sunrise: 07:04 Sunset: 16:56	N (S)	Beam	0	—	—	—	—	0	0	0	0	0	0	0	0	0	0	—	—	—	—
		Diffuse	27	—	—	—	—	25	53	74	86	92	92	86	74	53	25	—	—	—	—
	NE (SE)	Beam	5	—	—	—	—	65	52	0	0	0	0	0	0	0	0	—	—	—	—
		Diffuse	30	—	—	—	—	35	70	88	94	95	93	86	74	54	26	—	—	—	—
	E (E)	Beam	55	—	—	—	—	201	386	381	268	96	0	0	0	0	0	—	—	—	—
		Diffuse	37	—	—	—	—	53	106	131	133	123	109	92	75	53	25	—	—	—	—
	SE (NE)	Beam	130	—	—	—	—	220	494	607	607	527	391	228	67	0	0	—	—	—	—
		Diffuse	48	—	—	—	—	56	122	164	177	172	154	128	98	63	27	—	—	—	—
	S (N)	Beam	178	—	—	—	—	110	313	477	590	649	649	590	476	313	110	—	—	—	—
		Diffuse	54	—	—	—	—	40	96	144	175	190	190	175	144	96	40	—	—	—	—
	SW (NW)	Beam	130	—	—	—	—	0	0	68	228	391	527	607	607	494	220	—	—	—	—
		Diffuse	48	—	—	—	—	27	63	98	128	154	172	177	164	122	56	—	—	—	—
	W (W)	Beam	55	—	—	—	—	0	0	0	0	0	0	96	268	382	386	201	—	—	—
		Diffuse	37	—	—	—	—	25	53	75	92	109	123	133	131	106	53	—	—	—	—
	NW (SW)	Beam	5	—	—	—	—	0	0	0	0	0	0	0	52	65	—	—	—	—	—
		Diffuse	30	—	—	—	—	26	54	74	86	93	95	94	88	70	35	—	—	—	—
	Horiz.	Beam	95	—	—	—	—	19	124	249	347	401	401	347	249	124	19	—	—	—	—
	Horiz.	Diffuse	34	—	—	—	—	33	68	92	105	111	111	105	92	68	33	—	—	—	—
	Horiz.	Global	129	—	—	—	—	52	192	341	452	512	512	452	341	192	52	—	—	—	—
Feb 26 (N) / Aug 3 (S)																					
	Normal to beam		294	—	—	—	152	428	636	747	807	833	833	807	747	636	428	152	—	—	—
Sunrise: 06:31 Sunset: 17:29	N (S)	Beam	0	—	—	—	0	0	0	0	0	0	0	0	0	0	0	—	—	—	—
		Diffuse	36	—	—	—	19	46	73	90	102	107	107	102	90	73	46	19	—	—	—
	NE (SE)	Beam	14	—	—	—	78	166	124	0	0	0	0	0	0	0	0	—	—	—	—
		Diffuse	39	—	—	—	30	68	99	111	113	112	109	101	89	71	44	18	—	—	—
	E (E)	Beam	76	—	—	—	147	391	498	449	305	108	0	0	0	0	0	—	—	—	—
		Diffuse	48	—	—	—	41	96	143	158	153	140	125	108	90	70	44	19	—	—	—
	SE (NE)	Beam	141	—	—	—	130	386	580	647	619	518	365	188	12	0	0	—	—	—	—
		Diffuse	58	—	—	—	38	96	156	187	193	184	166	141	113	81	46	18	—	—	—
	S (N)	Beam	180	—	—	—	37	155	322	466	571	624	624	571	466	322	155	37	—	—	—
		Diffuse	62	—	—	—	25	67	120	161	186	199	199	186	161	120	67	25	—	—	—
	SW (NW)	Beam	141	—	—	—	0	0	0	12	188	365	518	619	647	580	386	130	—	—	—
		Diffuse	58	—	—	—	18	46	81	113	141	166	184	193	187	156	96	38	—	—	—
	W (W)	Beam	76	—	—	—	0	0	0	0	0	0	108	305	449	498	391	147	—	—	—
		Diffuse	48	—	—	—	19	44	70	90	108	125	140	153	158	143	96	41	—	—	—
	NW (SW)	Beam	14	—	—	—	0	0	0	0	0	0	0	0	124	166	78	—	—	—	—
		Diffuse	39	—	—	—	18	44	71	89	101	109	112	113	111	99	68	30	—	—	—
	Horiz.	Beam	143	—	—	—	7	81	229	373	483	541	541	483	373	229	81	7	—	—	—
	Horiz.	Diffuse	42	—	—	—	24	56	88	108	118	123	123	118	108	88	56	24	—	—	—
	Horiz.	Global	185	—	—	—	31	137	317	481	601	664	664	601	481	317	137	31	—	—	—
Mar 29 (N) / Sep 3 (S)																					
	Normal to beam		354	—	—	93	335	598	737	818	863	883	883	863	818	737	598	335	93	—	—
Sunrise: 05:48 Sunset: 18:12	N (S)	Beam	0	—	—	6	0	0	0	0	0	0	0	0	0	0	0	6	—	—	—
		Diffuse	47	—	—	15	41	74	95	110	119	124	124	119	110	95	74	41	15	—	—
	NE (SE)	Beam	36	—	—	70	225	306	233	84	0	0	0	0	0	0	0	—	—	—	—
		Diffuse	52	—	—	23	64	111	131	136	135	131	126	118	105	88	65	34	12	—	—
	E (E)	Beam	101	—	—	93	332	552	584	497	329	115	0	0	0	0	0	—	—	—	—
		Diffuse	61	—	—	28	80	145	176	179	169	154	139	124	107	88	66	36	13	—	—
	SE (NE)	Beam	139	—	—	62	243	474	592	619	567	450	287	101	0	0	0	—	—	—	—
		Diffuse	67	—	—	22	67	134	177	196	195	184	168	148	124	96	67	34	12	—	—
	S (N)	Beam	147	—	—	0	13	119	254	379	472	521	521	472	379	254	119	13	0	—	—
		Diffuse	68	—	—	14	43	91	133	165	184	192	192	184	165	133	91	43	14	—	—
	SW (NW)	Beam	139	—	—	0	0	0	0	0	101	288	450	567	619	592	474	243	61	—	—
		Diffuse	67	—	—	12	34	67	96	124	148	168	184	195	196	177	134	67	22	—	—
	W (W)	Beam	101	—	—	0	0	0	0	0	0	116	329	497	584	552	332	93	—	—	—
		Diffuse	61	—	—	13	36	66	88	107	124	139	154	169	179	176	145	80	28	—	—
	NW (SW)	Beam	36	—	—	0	0	0	0	0	0	0	0	84	233	306	225	70	—	—	—
		Diffuse	52	—	—	12	34	65	88	105	118	126	131	135	136	131	111	64	23	—	—
	Horiz.	Beam	207	—	—	2	46	198	371	528	643	703	703	643	528	371	198	46	2	—	—
	Horiz.	Diffuse	51	—	—	16	45	82	106	120	127	129	129	127	120	106	82	45	16	—	—
	Horiz.	Global	258	—	—	18	91	280	477	648	770	832	832	770	648	477	280	91	18	—	—

**Table 2.33(e)** Predicted clear day beam and diffuse irradiances ( $/W\cdot m^{-2}$ ) on vertical and horizontal surfaces on specified days in northern (N) and southern (S) hemispheres (see notes at foot of table): latitude  $40^{\circ}$  N/S — *continued*

Date and times of sunrise/sunset	Orientation	Type	Daily mean irradiance ( $/W\cdot m^{-2}$ ) and mean hourly irradiance ( $/W\cdot m^{-2}$ ) for stated solar time*																			
			Mean	0330	0430	0530	0630	0730	0830	0930	1030	1130	1230	1330	1430	1530	1630	1730	1830	1930	2030	
Apr 28 (N)/ Oct 3 (S)																						
	Normal to beam		398	—	—	209	505	682	786	849	885	902	902	885	849	786	682	505	209	—	—	
Sunrise: 05:11 Sunset: 18:49	N (S)	Beam	8	—	—	53	54	0	0	0	0	0	0	0	0	0	0	0	54	53	—	—
		Diffuse	58	—	—	32	70	97	112	124	132	135	135	132	125	112	97	70	32	—	—	
	NE (SE)	Beam	59	—	—	180	381	408	321	170	0	0	0	0	0	0	0	0	0	—	—	
		Diffuse	63	—	—	48	106	141	152	152	148	143	136	128	116	99	79	53	23	—	—	
	E (E)	Beam	117	—	—	201	485	611	604	501	328	114	0	0	0	0	0	0	0	—	—	
		Diffuse	70	—	—	52	121	171	188	186	173	160	147	133	117	99	79	54	24	—	—	
	SE (NE)	Beam	123	—	—	105	305	456	534	539	475	355	194	11	0	0	0	0	0	—	—	
		Diffuse	71	—	—	38	96	148	178	190	186	177	165	149	129	104	80	53	23	—	—	
	S (N)	Beam	98	—	—	0	0	34	151	261	343	388	388	343	260	151	34	0	0	—	—	
		Diffuse	69	—	—	25	63	102	135	160	174	180	180	174	160	135	102	63	25	—	—	
	SW (NW)	Beam	123	—	—	0	0	0	0	0	11	194	355	475	538	534	456	305	105	—	—	
		Diffuse	71	—	—	23	53	80	104	129	149	165	177	186	190	178	148	96	38	—	—	
	W (W)	Beam	117	—	—	0	0	0	0	0	0	114	328	501	604	611	485	201	—	—		
		Diffuse	70	—	—	24	54	79	99	117	133	147	160	173	186	188	171	121	52	—	—	
	NW (SW)	Beam	59	—	—	0	0	0	0	0	0	0	0	171	321	408	381	180	—	—		
		Diffuse	63	—	—	23	53	79	99	116	128	136	143	148	152	152	141	106	48	—	—	
	Horiz.	Beam	259	—	—	16	128	301	479	634	747	806	806	747	634	479	301	128	16	—	—	
	Horiz.	Diffuse	57	—	—	30	67	97	115	125	128	129	129	128	125	115	97	67	30	—	—	
	Horiz.	Global	316	—	—	46	195	398	594	759	875	935	935	875	759	594	398	195	46	—	—	
May 29 (N)/ Nov 3 (S)																						
	Normal to beam		427	—	102	335	580	719	805	859	891	906	906	891	859	805	719	580	335	102	—	
Sunrise: 04:42 Sunset: 19:18	N (S)	Beam	24	—	47	121	119	39	0	0	0	0	0	0	0	0	39	119	121	47	—	
		Diffuse	66	—	21	51	88	111	124	132	138	140	140	138	132	124	111	88	51	21	—	
	NE (SE)	Beam	80	—	97	304	462	464	373	227	54	0	0	0	0	0	0	0	0	—	—	
		Diffuse	70	—	30	74	129	157	164	159	154	148	140	132	122	107	88	65	35	14	—	
	E (E)	Beam	125	—	91	309	535	617	594	486	317	110	0	0	0	0	0	0	0	—	—	
		Diffuse	75	—	29	75	140	180	191	183	171	161	149	135	121	106	86	63	34	14	—	
	SE (NE)	Beam	107	—	31	133	294	409	466	460	394	276	121	0	0	0	0	0	0	—	—	
		Diffuse	73	—	19	52	107	150	175	181	177	170	162	147	129	110	87	63	34	14	—	
	S (N)	Beam	63	—	0	0	0	0	66	165	240	281	281	240	165	66	0	0	0	—	—	
		Diffuse	70	—	14	35	71	105	134	154	166	171	171	166	154	134	105	71	35	14	—	
	SW (NW)	Beam	107	—	0	0	0	0	0	0	121	276	394	460	466	409	294	133	31	—	—	
		Diffuse	73	—	14	34	63	87	110	129	147	162	170	177	181	175	150	107	52	19	—	
	W (W)	Beam	125	—	0	0	0	0	0	0	0	110	317	486	594	617	535	309	91	—	—	
		Diffuse	75	—	14	34	63	86	106	121	135	149	161	171	183	191	180	140	75	29	—	
	NW (SW)	Beam	80	—	0	0	0	0	0	0	0	0	55	227	373	464	462	304	97	—	—	
		Diffuse	70	—	14	35	65	88	107	122	132	140	148	154	159	164	157	129	74	30	—	
	Horiz.	Beam	291	—	3	48	191	366	540	689	797	854	854	797	689	540	366	191	48	3	—	
	Horiz.	Diffuse	61	—	18	44	79	104	119	125	127	128	128	127	125	119	104	79	44	18	—	
	Horiz.	Global	351	—	21	92	270	470	659	814	924	982	982	924	814	659	470	270	92	21	—	
Jun 21 (N)/ Dec 21 (S)																						
	Normal to beam		432	—	122	367	592	724	806	858	888	903	903	888	858	806	724	592	367	122	—	
Sunrise: 04:35 Sunset: 19:25	N (S)	Beam	30	—	60	140	134	57	0	0	0	0	0	0	0	0	57	135	140	60	—	
		Diffuse	68	—	24	57	93	114	126	134	140	141	141	140	134	126	114	93	57	24	—	
	NE (SE)	Beam	84	—	117	335	476	474	384	240	69	0	0	0	0	0	0	0	0	—	—	
		Diffuse	72	—	33	82	134	160	165	160	155	150	140	133	123	108	90	67	39	16	—	
	E (E)	Beam	126	—	106	334	539	614	587	479	312	108	0	0	0	0	0	0	0	—	—	
		Diffuse	76	—	31	82	143	181	190	183	171	161	149	136	122	106	88	65	38	15	—	
	SE (NE)	Beam	102	—	33	137	286	394	446	438	371	255	102	0	0	0	0	0	0	—	—	
		Diffuse	73	—	21	57	109	150	172	179	175	169	161	147	130	110	89	65	38	15	—	
	S (N)	Beam	54	—	0	0	0	0	44	140	213	253	253	213	140	44	0	0	0	—	—	
		Diffuse	70	—	15	39	73	106	133	152	164	169	169	164	152	133	106	73	39	15	—	
	SW (NW)	Beam	102	—	0	0	0	0	0	0	103	255	371	438	446	394	285	137	33	—	—	
		Diffuse	73	—	15	38	65	89	110	130	147	161	169	175	179	172	150	109	57	21	—	
	W (W)	Beam	126	—	0	0	0	0	0	0	0	108	312	479	587	614	538	334	106	—	—	
		Diffuse	76	—	15	38	65	88	106	122	136	149	161	171	183	190	181	143	82	31	—	
	NW (SW)	Beam	85	—	0	0	0	0	0	0	0	0	69	240	384	474	476	335	117	—	—	
		Diffuse	72	—	16	39	67	90	108	123	133	140	150	155	160	165	160	134	82	33	—	
	Horiz.	Beam	297	—	4	60	206	380	551	698	804	860	860	804	698	551	380	206	60	4	—	
	Horiz.	Diffuse	62	—	20	48	81	105	119	125	127	127	127	127	125	119	105	81	48	20	—	
	Horiz.	Global	358	—	24	108	287	485	670	823	931	987	987	931	823	670	485	287	108	24	—	

**Table 2.33(e)** Predicted clear day beam and diffuse irradiances ( $/\text{W}\cdot\text{m}^{-2}$ ) on vertical and horizontal surfaces on specified days in northern (N) and southern (S) hemispheres (see notes at foot of table): latitude  $40^\circ\text{N/S}$  — *continued*

Date and times of sunrise/sunset	Orientation	Type	Daily mean irradiance ( $/\text{W}\cdot\text{m}^{-2}$ ) and mean hourly irradiance ( $/\text{W}\cdot\text{m}^{-2}$ ) for stated solar time*																			
			Mean	0330	0430	0530	0630	0730	0830	0930	1030	1130	1230	1330	1430	1530	1630	1730	1830	1930	2030	
Jul 4 (N) / Jan 28 (S)			Normal to beam	430	—	115	357	587	721	804	856	887	902	902	887	856	804	721	587	357	115	—
Sunrise: 04:37 Sunset: 19:23	N (S)	Beam	28	—	55	134	130	52	0	0	0	0	0	0	0	0	52	130	134	55	—	
		Diffuse	67	—	23	55	91	113	125	134	140	139	139	140	134	125	113	91	55	23	—	
	NE (SE)	Beam	83	—	110	325	471	470	380	235	65	0	0	0	0	0	0	0	0	0	—	
		Diffuse	71	—	32	79	133	158	163	160	155	148	139	133	123	107	89	66	38	15	—	
	E (E)	Beam	125	—	101	326	536	614	588	480	313	109	0	0	0	0	0	0	0	0	—	
		Diffuse	76	—	30	80	143	179	189	183	171	160	148	136	122	105	87	65	36	14	—	
	SE (NE)	Beam	103	—	32	136	287	398	451	444	378	261	108	0	0	0	0	0	0	0	—	
		Diffuse	73	—	20	56	108	149	171	180	176	168	160	148	130	109	87	64	36	15	—	
	S (N)	Beam	57	—	0	0	0	0	50	148	221	261	261	221	148	50	0	0	0	0	—	
		Diffuse	70	—	14	38	73	105	132	153	165	168	168	165	153	132	105	73	38	14	—	
	SW (NW)	Beam	103	—	0	0	0	0	0	0	0	108	261	378	444	451	398	287	136	32	—	
		Diffuse	73	—	15	36	64	87	109	130	148	160	168	176	180	171	149	108	56	20	—	
	W (W)	Beam	125	—	0	0	0	0	0	0	0	0	109	313	480	588	614	536	326	101	—	
		Diffuse	76	—	14	36	65	87	105	122	136	148	160	171	183	189	179	143	80	30	—	
	NW (SW)	Beam	83	—	0	0	0	0	0	0	0	0	0	65	235	380	470	471	325	110	—	
		Diffuse	71	—	15	38	66	89	107	123	133	139	148	155	160	163	158	133	79	32	—	
Horiz.	Beam	294	—	4	56	201	375	546	693	800	857	857	800	693	546	375	201	56	4	—		
	Diffuse	61	—	19	47	81	104	118	125	127	127	127	127	125	118	104	81	47	19	—		
	Global	356	—	23	103	282	479	664	818	927	984	984	927	818	664	479	282	103	23	—		
Aug 4 (N) / Feb 25 (S)			Normal to beam	409	—	—	240	533	692	787	845	880	895	895	880	845	787	692	533	240	—	
Sunrise: 05:00 Sunset: 19:00	N (S)	Beam	14	—	—	74	78	0	0	0	0	0	0	0	0	0	0	78	74	—	—	
		Diffuse	61	—	—	38	77	101	117	127	134	136	136	134	127	117	101	77	38	—	—	
	NE (SE)	Beam	69	—	—	213	412	428	340	192	15	0	0	0	0	0	0	0	0	—	—	
		Diffuse	66	—	—	56	114	146	156	154	149	144	137	129	118	102	82	57	27	—	—	
	E (E)	Beam	122	—	—	227	505	611	596	491	322	112	0	0	0	0	0	0	0	—	—	
		Diffuse	73	—	—	58	128	173	189	184	171	159	147	133	118	101	81	57	27	—	—	
	SE (NE)	Beam	117	—	—	108	302	436	504	503	439	321	163	0	0	0	0	0	0	—	—	
		Diffuse	72	—	—	42	100	147	176	185	181	172	162	148	128	106	82	56	27	—	—	
	S (N)	Beam	82	—	—	0	0	5	116	220	300	342	342	300	220	116	5	0	0	—	—	
		Diffuse	69	—	—	28	65	102	134	157	169	174	174	169	157	134	102	65	28	—	—	
	SW (NW)	Beam	116	—	—	0	0	0	0	0	0	163	321	439	503	504	436	302	108	—	—	
		Diffuse	72	—	—	27	56	82	106	128	148	162	172	181	185	176	147	100	42	—	—	
	W (W)	Beam	119	—	—	0	0	0	0	0	0	0	112	322	491	596	611	505	227	—	—	
		Diffuse	72	—	—	27	57	81	101	118	133	147	159	171	184	189	173	128	58	—	—	
	NW (SW)	Beam	67	—	—	0	0	0	0	0	0	0	0	15	192	340	428	412	213	—	—	
		Diffuse	66	—	—	27	57	82	102	118	129	137	144	149	154	156	146	114	56	—	—	
Horiz.	Beam	269	—	—	23	152	325	500	651	762	820	820	762	651	500	325	152	23	—	—		
	Diffuse	59	—	—	34	72	99	116	124	127	127	127	127	124	116	99	72	34	—	—		
	Global	328	—	—	57	224	424	616	775	889	947	947	889	775	616	424	224	57	—	—		
Sep 4 (N) / Mar 28 (S)			Normal to beam	365	—	—	132	398	624	747	820	861	880	880	861	820	747	624	398	132	—	
Sunrise: 05:36 Sunset: 18:24	N (S)	Beam	1	—	—	17	5	0	0	0	0	0	0	0	0	0	0	5	17	—	—	
		Diffuse	50	—	—	21	50	81	100	113	122	126	126	122	113	100	81	50	21	—	—	
	NE (SE)	Beam	43	—	—	104	280	339	261	112	0	0	0	0	0	0	0	0	0	—	—	
		Diffuse	55	—	—	32	77	121	138	140	138	134	128	120	108	91	70	40	16	—	—	
	E (E)	Beam	106	—	—	131	392	572	588	495	327	114	0	0	0	0	0	0	0	—	—	
		Diffuse	64	—	—	36	93	155	180	180	168	155	140	125	109	91	70	41	17	—	—	
	SE (NE)	Beam	133	—	—	80	273	470	570	588	532	415	253	69	0	0	0	0	0	—	—	
		Diffuse	67	—	—	28	76	139	177	192	190	180	165	147	124	98	71	40	16	—	—	
	S (N)	Beam	129	—	—	0	0	93	219	337	426	472	472	425	337	219	93	0	0	—	—	
		Diffuse	68	—	—	18	49	95	133	162	178	185	185	178	162	133	95	49	18	—	—	
	SW (NW)	Beam	134	—	—	0	0	0	0	0	0	70	253	415	532	588	570	470	273	80	—	
		Diffuse	67	—	—	16	40	71	98	124	147	165	180	190	192	177	139	76	28	—	—	
	W (W)	Beam	106	—	—	0	0	0	0	0	0	0	114	327	495	588	572	392	131	—	—	
		Diffuse	64	—	—	17	41	70	91	109	125	140	155	169	180	180	155	93	36	—	—	
	NW (SW)	Beam	43	—	—	0	0	0	0	0	0	0	0	0	112	261	339	280	104	—	—	
		Diffuse	55	—	—	16	40	70	91	108	120	128	134	138	140	138	121	77	32	—	—	
Horiz.	Beam	223	—	—	5	71	231	405	560	674	734	734	674	560	405	231	71	5	—	—		
	Diffuse	53	—	—	21	52	87	109	121	126	128	128	126	121	109	87	52	21	—	—		
	Global	276	—	—	26	123	318	514	681	800	862	862	800	681	514	318	123	26	—	—		

**Table 2.33(e)** Predicted clear day beam and diffuse irradiances ( $/W\cdot m^{-2}$ ) on vertical and horizontal surfaces on specified days in northern (N) and southern (S) hemispheres (see notes at foot of table): latitude  $40^{\circ}$  N/S — *continued*

Date and times of sunrise/sunset	Orientation	Type	Daily mean irradiance ( $/W\cdot m^{-2}$ ) and mean hourly irradiance ( $/W\cdot m^{-2}$ ) for stated solar time*																		
			Mean	0330	0430	0530	0630	0730	0830	0930	1030	1130	1230	1330	1430	1530	1630	1730	1830	1930	2030
Oct 4 (N) / Apr 28 (S)																					
		Normal to beam	313	—	—	—	205	498	673	769	821	845	845	821	769	673	498	205	—	—	—
Sunrise: 06:15 Sunset: 17:45	N (S)	Beam	0	—	—	—	0	0	0	0	0	0	0	0	0	0	0	0	—	—	—
		Diffuse	39	—	—	—	26	56	81	96	107	112	112	107	96	81	56	26	—	—	—
	NE (SE)	Beam	20	—	—	—	119	217	163	21	0	0	0	0	0	0	0	0	—	—	—
		Diffuse	43	—	—	—	40	84	111	119	120	118	114	107	94	77	52	23	—	—	—
	E (E)	Beam	85	—	—	—	202	459	532	466	313	110	0	0	0	0	0	0	—	—	—
		Diffuse	53	—	—	—	52	116	157	166	159	144	129	113	96	77	52	24	—	—	—
	SE (NE)	Beam	140	—	—	—	166	432	590	638	599	492	337	156	0	0	0	0	—	—	—
		Diffuse	61	—	—	—	47	111	166	190	194	183	165	143	116	87	54	23	—	—	—
	S (N)	Beam	170	—	—	—	33	152	302	436	534	586	586	534	436	302	152	33	—	—	—
		Diffuse	64	—	—	—	31	77	126	162	185	195	195	185	162	126	77	31	—	—	—
	SW (NW)	Beam	140	—	—	—	0	0	0	0	156	337	492	599	638	590	432	166	—	—	—
		Diffuse	61	—	—	—	23	54	87	116	143	165	183	194	190	166	111	47	—	—	—
	W (W)	Beam	85	—	—	—	0	0	0	0	0	110	313	467	532	459	202	—	—	—	—
		Diffuse	53	—	—	—	24	52	77	96	113	129	144	159	166	157	116	52	—	—	—
	NW (SW)	Beam	20	—	—	—	0	0	0	0	0	0	0	22	163	217	119	—	—	—	—
		Diffuse	43	—	—	—	23	52	77	94	107	114	118	120	119	111	84	40	—	—	—
	Horiz.	Beam	165	—	—	—	15	121	280	428	539	598	598	539	428	280	121	15	—	—	—
	Horiz.	Diffuse	45	—	—	—	30	66	95	112	121	124	124	121	112	95	66	30	—	—	—
	Horiz.	Global	210	—	—	—	45	187	375	540	660	722	722	660	540	375	187	45	—	—	—
Nov 4 (N) / May 29 (S)																					
		Normal to beam	256	—	—	—	80	287	551	683	753	784	784	753	683	551	287	80	—	—	—
Sunrise: 06:54 Sunset: 17:06	N (S)	Beam	0	—	—	—	0	0	0	0	0	0	0	0	0	0	0	0	—	—	—
		Diffuse	30	—	—	—	11	30	59	78	90	96	96	90	78	59	30	11	—	—	—
	NE (SE)	Beam	7	—	—	—	33	91	72	0	0	0	0	0	0	0	0	0	—	—	—
		Diffuse	32	—	—	—	17	44	78	94	99	100	97	90	78	59	30	11	—	—	—
	E (E)	Beam	61	—	—	—	75	256	422	401	278	98	0	0	0	0	0	0	—	—	—
		Diffuse	40	—	—	—	23	64	118	139	139	127	113	97	79	58	30	12	—	—	—
	SE (NE)	Beam	134	—	—	—	73	270	524	619	610	523	384	217	52	0	0	0	—	—	—
		Diffuse	51	—	—	—	23	66	133	170	182	175	157	132	102	68	31	11	—	—	—
	S (N)	Beam	179	—	—	—	28	126	320	475	585	641	641	585	475	320	126	28	—	—	—
		Diffuse	56	—	—	—	16	47	104	149	178	192	192	178	149	104	47	16	—	—	—
	SW (NW)	Beam	134	—	—	—	0	0	0	52	217	384	523	610	619	524	270	73	—	—	—
		Diffuse	51	—	—	—	11	31	68	102	132	157	175	182	170	133	66	23	—	—	—
	W (W)	Beam	61	—	—	—	0	0	0	0	0	98	278	401	422	256	75	—	—	—	—
		Diffuse	40	—	—	—	12	30	58	79	97	113	127	139	139	118	64	23	—	—	—
	NW (SW)	Beam	7	—	—	—	0	0	0	0	0	0	0	0	72	91	33	—	—	—	—
		Diffuse	32	—	—	—	11	30	59	78	90	97	100	99	94	78	44	17	—	—	—
	Horiz.	Beam	108	—	—	—	1	32	154	283	385	440	440	385	283	154	32	1	—	—	—
	Horiz.	Diffuse	36	—	—	—	14	39	74	96	109	114	114	109	96	74	39	14	—	—	—
	Horiz.	Global	144	—	—	—	15	71	228	379	494	554	554	494	379	228	71	15	—	—	—
Dec 4 (N) / Jun 3 (S)																					
		Normal to beam	213	—	—	—	172	432	602	688	725	725	688	602	432	172	—	—	—	—	—
Sunrise: 07:20 Sunset: 16:40	N (S)	Beam	0	—	—	—	0	0	0	0	0	0	0	0	0	0	0	0	—	—	—
		Diffuse	24	—	—	—	20	44	64	78	85	85	78	64	44	20	—	—	—	—	—
	NE (SE)	Beam	2	—	—	—	36	25	0	0	0	0	0	0	0	0	0	0	—	—	—
		Diffuse	25	—	—	—	27	56	76	85	87	85	78	65	45	21	—	—	—	—	—
	E (E)	Beam	45	—	—	—	144	317	339	244	87	0	0	0	0	0	0	0	—	—	—
		Diffuse	32	—	—	—	41	87	114	121	113	100	84	66	44	20	—	—	—	—	—
	SE (NE)	Beam	121	—	—	—	168	424	564	581	513	389	236	84	0	0	0	0	—	—	—
		Diffuse	43	—	—	—	45	102	146	165	162	145	120	88	53	22	—	—	—	—	—
	S (N)	Beam	168	—	—	—	93	282	459	578	638	638	578	459	282	93	—	—	—	—	—
		Diffuse	48	—	—	—	33	82	130	164	180	180	164	130	82	33	—	—	—	—	—
	SW (NW)	Beam	121	—	—	—	0	0	84	236	389	513	581	564	424	168	—	—	—	—	—
		Diffuse	43	—	—	—	22	53	88	120	145	162	165	146	102	45	—	—	—	—	—
	W (W)	Beam	45	—	—	—	0	0	0	0	0	87	244	339	317	144	—	—	—	—	—
		Diffuse	32	—	—	—	20	44	66	84	100	113	121	114	87	41	—	—	—	—	—
	NW (SW)	Beam	2	—	—	—	0	0	0	0	0	0	0	0	25	36	—	—	—	—	—
		Diffuse	25	—	—	—	21	45	65	78	85	87	85	76	56	27	—	—	—	—	—
	Horiz.	Beam	75	—	—	—	10	81	192	283	333	333	283	192	81	10	—	—	—	—	—
	Horiz.	Diffuse	30	—	—	—	26	57	82	97	103	103	97	82	57	26	—	—	—	—	—
	Horiz.	Global	104	—	—	—	36	138	274	380	436	436	380	274	138	36	—	—	—	—	—

*Notes:*

- (1) Hourly values in the first and last columns are calculated for a time halfway between sunrise and end of sunrise hour and halfway between beginning of sunset hour and sunset, respectively.
- (2) Orientations for southern hemisphere shown in parentheses.
- (3) Computed using a Linke turbidity factor of 3.5.
- (4) Ground reflected component included in the slope diffuse irradiance values; ground albedo: 0.20.
- (5) Altitude: 0 m.
- (6) Values corrected to mean solar distance (MSD) in the northern hemisphere, see CIBSE Guide J: *Weather, solar and illuminance data*. Apply MSD ratio adjustment for southern hemisphere.