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Plastics — Standard table for reference global solar spectral irradiance at sea level — Horizontal, relative air mass 1

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TECHNICAL REPORT

ISO/TR 17801

First edition
2014-06-15

Plastics — Standard table for reference global solar spectral irradiance at sea level — Horizontal, relative air mass 1

Plastiques — Table de référence pour l'irradiance solaire spectrale totale au niveau de la mer — Horizontale, masse d'air relative 1

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Foreword

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For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 61, *Plastics*, Subcommittee SC 6, *Ageing, chemical and environmental resistance*.

Introduction

The effect of solar radiation on surface of the earth (global radiation) is the most important primary weathering factor. The photons absorbed by the molecules during radiation exposure are often sufficient to split chemical bonds, start photochemical reactions and cause an electron transfer[1]. The spectral irradiance of the solar radiation is variable locally and in time. A reference spectrum is therefore required as a basis for the simulation of the spectral irradiance of solar radiation with artificial radiation sources/radiation systems. Data of the CIE (Commission Internationale de L'Éclairage) Publication (No. 85, 1989) have been used as a basis for years. Table 4 specifies the spectral irradiance of global radiation (direct and diffuse radiation) for a cloudless sky, zenith position of the sun by day and night comparisons at the equator at sea level. But in CIE 85, the data of the global solar irradiance only begins at 305 nm, the step width is very rough and the calculation code got unexplainably lost. Therefore, there have been efforts to revise CIE No. 85 for many years. The new Table 1 gives modelled data (using the SMARTS model version 2.9.2) generated using an air mass zero (AM0) spectrum based on extraterrestrial spectrum of Gueymard[2][3].

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Plastics — Standard table for reference global solar spectral irradiance at sea level — Horizontal, relative air mass 1

1 Scope

This Technical Report provides a reference spectrum to the field of weathering degradation (see Table 1) in order to classify solar simulators in the UV, visible and infrared wavelength range.

The photochemical ageing which occurs in practice is simulated with time compression in laboratory weathering instruments by sequencing maximum stress climate episodes. To give a spectral irradiance target, the table specifies the spectral irradiance of global radiation (direct and diffuse radiation) with a cloudless sky, zenith position of the sun by day and night comparisons at the equator at sea level as defined in Table 4 of CIE No. 85 .This is a realistic maximum exposure under representative clear sky conditions.

The data contained in Table 1, Figure 2, and Figure 3 were generated using the SMARTS2 Version 2.9.2[2] [3] to recalculate the CIE No. 85, Table 4.

Table 2 contains the original data from CIE No. 85, Table 4. The numbers are shown in Figure 2 and Figure 3 as well.

2 References

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

CIE No. 85, Technical Report; *Solar Spectral Irradiance*; 1989

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1
global solar irradiance
solar radiant flux, both direct and diffuse, received on a horizontal plane unit area from a solid angle of 2π steradians

Note 1 to entry: It is measured in watts per square metre ($W \cdot m^{-2}$).

3.2
spectral irradiance
E_λ
radiant flux per unit area per wavelength interval

Note 1 to entry: It is measured in watts per square metre per nanometre ($W \cdot m^{-2} \cdot nm^{-1}$).

3.3
air mass
relative optical path length of solar radiation through Earth's atmosphere for the purpose of this Technical Report

Note 1 to entry: As solar radiation passes through the atmosphere, it is attenuated by scattering and absorption. The more atmosphere through which it passes, the greater is the attenuation.

4 Reference global solar spectral irradiance at sea level

The reference global solar spectral irradiance for air mass 1.0 (illustration see Figure 1) is given in Table 1 and Figure 2 and Figure 3. This is the global distribution (direct and diffuse) of the solar radiation corresponding to an integrated irradiance of 1 092 W m^{-2} incident on a sun-facing horizontal plane considering the ground reflection of 0,2 under the following atmospheric conditions.

— The United States Standard Atmosphere Profile of 1976 (USSA76) except for the prescribed parameters below:

  — total hemispherical horizontal component;

  — total column water vapour 1,42 cm;

  — total column ozone 0,34 cm;

  — aerosol optical depth at 500 nm 0,1.

— The rural aerosol distribution of Shettle and Fenn was assumed.

— A carbon dioxide concentration of 370 ppm by volume was assumed.

— The direct beam included a circumsolar component, as if seen with a 5,6° field of view pyrheliometer.

Annex A contains the SMARTS2 input files used to generate the tabular data in Table 1.

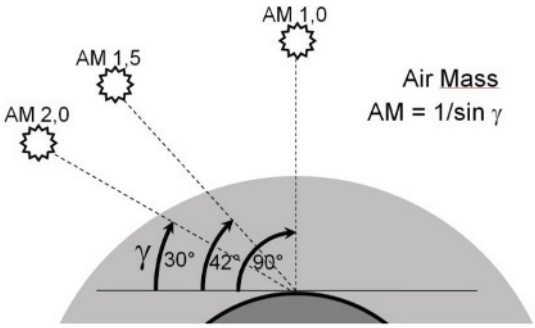


Figure 1 — Air mass coefficient defines the direct optical path length through the Earth's atmosphere

Table 1 — Reference global solar irradiance recalculated with SMART2 (input data from CIE No. 85, Table 4)

Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)
285,0	1,85E-11	305,5	0,0760	326,0	0,6710	346,5	0,7450	367,0	1,0310
285,5	6,67E-11	306,0	0,0740	326,5	0,7030	347,0	0,7560	367,5	1,0100
286,0	1,84E-10	306,5	0,0820	327,0	0,6900	347,5	0,7280	368,0	0,9490
286,5	8,17E-10	307,0	0,1010	327,5	0,6710	348,0	0,7240	368,5	0,9410
287,0	2,11E-09	307,5	0,1210	328,0	0,6270	348,5	0,7340	369,0	0,9830
287,5	6,13E-09	308,0	0,1270	328,5	0,6420	349,0	0,7060	369,5	1,0540
288,0	2,35E-08	308,5	0,1350	329,0	0,7130	349,5	0,7230	370,0	1,0670
288,5	5,24E-08	309,0	0,1290	329,5	0,7860	350,0	0,7970	370,5	0,9630
289,0	1,38E-07	309,5	0,1290	330,0	0,7920	350,5	0,8560	371,0	0,9770
289,5	3,99E-07	310,0	0,1470	330,5	0,7290	351,0	0,8310	371,5	1,0130
290,0	9,48E-07	310,5	0,1860	331,0	0,6880	351,5	0,7990	372,0	0,9470
290,5	1,84E-06	311,0	0,2290	331,5	0,7050	352,0	0,7780	372,5	0,9010
291,0	3,81E-06	311,5	0,2300	332,0	0,7220	352,5	0,7330	373,0	0,8670
291,5	9,09E-06	312,0	0,2420	332,5	0,7200	353,0	0,7780	373,5	0,7800
292,0	1,80E-05	312,5	0,2480	333,0	0,7050	353,5	0,8540	374,0	0,7770
292,5	2,53E-05	313,0	0,2640	333,5	0,6760	354,0	0,9010	374,5	0,7700
293,0	4,37E-05	313,5	0,2680	334,0	0,6880	354,5	0,9090	375,0	0,8210
293,5	9,18E-05	314,0	0,2870	334,5	0,7270	355,0	0,9080	375,5	0,9060
294,0	1,45E-04	314,5	0,2980	335,0	0,7510	355,5	0,8750	376,0	0,9370
294,5	2,04E-04	315,0	0,3080	335,5	0,7290	356,0	0,8190	376,5	0,9210
295,0	3,29E-04	315,5	0,2730	336,0	0,6670	356,5	0,7670	377,0	0,9870
295,5	6,18E-04	316,0	0,2740	336,5	0,6170	357,0	0,6730	377,5	1,0990
296,0	9,36E-04	316,5	0,3220	337,0	0,6050	357,5	0,6800	378,0	1,1830
296,5	1,23E-03	317,0	0,3670	337,5	0,6490	358,0	0,6320	378,5	1,1510
297,0	1,52E-03	317,5	0,3930	338,0	0,6940	358,5	0,5860	379,0	1,0260
297,5	2,53E-03	318,0	0,3700	338,5	0,7230	359,0	0,6880	379,5	0,9190
298,0	3,52E-03	318,5	0,3740	339,0	0,7340	359,5	0,8280	380,0	0,9640
298,5	3,99E-03	319,0	0,4030	339,5	0,7500	360,0	0,8740	380,5	1,0320
299,0	5,06E-03	319,5	0,3970	340,0	0,7960	360,5	0,8250	381,0	1,0480
299,5	7,77E-03	320,0	0,4170	340,5	0,7920	361,0	0,7580	381,5	0,9440
300,0	8,60E-03	320,5	0,4780	341,0	0,7410	361,5	0,7410	382,0	0,8030
300,5	1,00E-02	321,0	0,4700	341,5	0,7340	362,0	0,7750	382,5	0,6940
301,0	1,40E-02	321,5	0,4460	342,0	0,7640	362,5	0,8470	383,0	0,6210
301,5	1,80E-02	322,0	0,4300	342,5	0,7900	363,0	0,8690	383,5	0,6010
302,0	1,80E-02	322,5	0,4180	343,0	0,8010	363,5	0,8440	384,0	0,6940
302,5	2,50E-02	323,0	0,3980	343,5	0,7560	364,0	0,8730	384,5	0,8350
303,0	3,80E-02	323,5	0,4470	344,0	0,6530	364,5	0,8630	385,0	0,9150
303,5	4,60E-02	324,0	0,4910	344,5	0,6250	365,0	0,8950	385,5	0,8730
304,0	4,70E-02	324,5	0,5120	345,0	0,7090	365,5	0,9830	386,0	0,8410
304,5	0,056	325,0	0,517	345,5	0,753	366,0	1,052	386,5	0,874
305,0	0,071	325,5	0,588	346,0	0,733	366,5	1,052	387,0	0,880

Table 1 *(continued)*

Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)
387,5	0,867	416,0	1,606	457,0	1,903	498,0	1,790	539,0	1,727
388,0	0,857	417,0	1,564	458,0	1,861	499,0	1,788	540,0	1,667
388,5	0,850	418,0	1,494	459,0	1,844	500,0	1,781	541,0	1,603
389,0	0,922	419,0	1,552	460,0	1,830	501,0	1,726	542,0	1,745
389,5	1,021	420,0	1,420	461,0	1,892	502,0	1,725	543,0	1,713
390,0	1,070	421,0	1,610	462,0	1,907	503,0	1,805	544,0	1,774
390,5	1,078	422,0	1,586	463,0	1,912	504,0	1,686	545,0	1,732
391,0	1,140	423,0	1,533	464,0	1,851	505,0	1,801	546,0	1,717
391,5	1,155	424,0	1,522	465,0	1,825	506,0	1,872	547,0	1,737
392,0	1,062	425,0	1,566	466,0	1,861	507,0	1,790	548,0	1,687
392,5	0,884	426,0	1,519	467,0	1,777	508,0	1,742	549,0	1,738
393,0	0,640	427,0	1,465	468,0	1,853	509,0	1,823	550,0	1,723
393,5	0,508	428,0	1,478	469,0	1,859	510,0	1,773	551,0	1,720
394,0	0,659	429,0	1,366	470,0	1,786	511,0	1,804	552,0	1,754
394,5	0,909	430,0	1,088	471,0	1,814	512,0	1,850	553,0	1,704
395,0	1,072	431,0	0,986	472,0	1,906	513,0	1,736	554,0	1,736
395,5	1,141	432,0	1,638	473,0	1,831	514,0	1,698	555,0	1,745
396,0	1,002	433,0	1,522	474,0	1,851	515,0	1,746	556,0	1,715
396,5	0,728	434,0	1,404	475,0	1,911	516,0	1,761	557,0	1,673
397,0	0,563	435,0	1,539	476,0	1,846	517,0	1,433	558,0	1,709
397,5	0,831	436,0	1,684	477,0	1,856	518,0	1,638	559,0	1,617
398,0	1,124	437,0	1,716	478,0	1,914	519,0	1,587	560,0	1,645
398,5	1,327	438,0	1,504	479,0	1,875	520,0	1,731	561,0	1,740
399,0	1,407	439,0	1,446	480,0	1,903	521,0	1,743	562,0	1,656
399,5	1,449	440,0	1,655	481,0	1,900	522,0	1,781	563,0	1,719
400,0	1,463	441,0	1,629	482,0	1,904	523,0	1,678	564,0	1,685
401,0	1,521	442,0	1,742	483,0	1,878	524,0	1,804	565,0	1,696
402,0	1,577	443,0	1,765	484,0	1,841	525,0	1,790	566,0	1,603
403,0	1,515	444,0	1,718	485,0	1,833	526,0	1,739	567,0	1,709
404,0	1,537	445,0	1,781	486,0	1,484	527,0	1,521	568,0	1,695
405,0	1,496	446,0	1,594	487,0	1,660	528,0	1,741	569,0	1,658
406,0	1,456	447,0	1,810	488,0	1,795	529,0	1,821	570,0	1,658
407,0	1,427	448,0	1,830	489,0	1,690	530,0	1,750	571,0	1,601
408,0	1,488	449,0	1,823	490,0	1,886	531,0	1,844	572,0	1,694
409,0	1,586	450,0	1,887	491,0	1,811	532,0	1,810	573,0	1,700
410,0	1,350	451,0	1,955	492,0	1,725	533,0	1,615	574,0	1,691
411,0	1,508	452,0	1,869	493,0	1,843	534,0	1,729	575,0	1,654
412,0	1,599	453,0	1,724	494,0	1,798	535,0	1,753	576,0	1,639
413,0	1,532	454,0	1,846	495,0	1,907	536,0	1,827	577,0	1,679
414,0	1,512	455,0	1,831	496,0	1,812	537,0	1,689	578,0	1,625
415,0	1,563	456,0	1,889	497,0	1,841	538,0	1,772	579,0	1,646
580,0	1,669	621,0	1,600	662,0	1,467	703,0	1,326	744,0	1,269

Table 1 *(continued)*

Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)
581,0	1,673	622,0	1,547	663,0	1,466	704,0	1,353	745,0	1,268
582,0	1,696	623,0	1,540	664,0	1,471	705,0	1,366	746,0	1,265
583,0	1,710	624,0	1,532	665,0	1,492	706,0	1,356	747,0	1,265
584,0	1,705	625,0	1,518	666,0	1,487	707,0	1,349	748,0	1,257
585,0	1,690	626,0	1,515	667,0	1,474	708,0	1,344	749,0	1,253
586,0	1,648	627,0	1,560	668,0	1,477	709,0	1,345	750,0	1,251
587,0	1,686	628,0	1,502	669,0	1,501	710,0	1,354	751,0	1,245
588,0	1,654	629,0	1,535	670,0	1,479	711,0	1,350	752,0	1,249
589,0	1,442	630,0	1,515	671,0	1,475	712,0	1,339	753,0	1,243
590,0	1,531	631,0	1,530	672,0	1,454	713,0	1,325	754,0	1,258
591,0	1,628	632,0	1,471	673,0	1,465	714,0	1,336	755,0	1,254
592,0	1,598	633,0	1,558	674,0	1,462	715,0	1,295	756,0	1,239
593,0	1,614	634,0	1,531	675,0	1,449	716,0	1,310	757,0	1,238
594,0	1,608	635,0	1,547	676,0	1,465	717,0	1,185	758,0	1,245
595,0	1,591	636,0	1,510	677,0	1,451	718,0	1,115	759,0	1,216
596,0	1,628	637,0	1,560	678,0	1,458	719,0	1,007	760,0	0,448
597,0	1,635	638,0	1,568	679,0	1,445	720,0	1,076	761,0	0,310
598,0	1,611	639,0	1,560	680,0	1,447	721,0	1,155	762,0	0,840
599,0	1,608	640,0	1,525	681,0	1,440	722,0	1,284	763,0	0,567
600,0	1,620	641,0	1,524	682,0	1,447	723,0	1,203	764,0	0,716
601,0	1,599	642,0	1,525	683,0	1,430	724,0	1,130	765,0	0,839
602,0	1,574	643,0	1,541	684,0	1,421	725,0	1,118	766,0	0,929
603,0	1,606	644,0	1,532	685,0	1,421	726,0	1,158	767,0	1,050
604,0	1,634	645,0	1,543	686,0	1,389	727,0	1,153	768,0	1,154
605,0	1,630	646,0	1,502	687,0	1,125	728,0	1,121	769,0	1,158
606,0	1,619	647,0	1,502	688,0	1,242	729,0	1,111	770,0	1,181
607,0	1,626	648,0	1,489	689,0	1,247	730,0	1,194	771,0	1,183
608,0	1,619	649,0	1,442	690,0	1,287	731,0	1,139	772,0	1,191
609,0	1,605	650,0	1,440	691,0	1,320	732,0	1,209	773,0	1,190
610,0	1,597	651,0	1,528	692,0	1,341	733,0	1,236	774,0	1,190
611,0	1,587	652,0	1,478	693,0	1,335	734,0	1,273	775,0	1,189
612,0	1,610	653,0	1,513	694,0	1,321	735,0	1,256	776,0	1,192
613,0	1,587	654,0	1,494	695,0	1,332	736,0	1,244	777,0	1,184
614,0	1,537	655,0	1,431	696,0	1,330	737,0	1,242	778,0	1,183
615,0	1,592	656,0	1,252	697,0	1,384	738,0	1,255	779,0	1,188
616,0	1,549	657,0	1,309	698,0	1,362	739,0	1,218	780,0	1,175
617,0	1,528	658,0	1,460	699,0	1,346	740,0	1,244	781,0	1,172
618,0	1,585	659,0	1,465	700,0	1,336	741,0	1,237	782,0	1,177
619,0	1,592	660,0	1,476	701,0	1,322	742,0	1,236	783,0	1,172
620,0	1,592	661,0	1,474	702,0	1,319	743,0	1,261	784,0	1,164
785,0	1,169	826,0	0,966	867,0	0,916	908,0	0,699	949,0	0,573
786,0	1,170	827,0	1,008	868,0	0,960	909,0	0,741	950,0	0,214

Table 1 *(continued)*

Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)
787,0	1,161	828,0	0,898	869,0	0,950	910,0	0,681	951,0	0,553
788,0	1,148	829,0	0,959	870,0	0,968	911,0	0,713	952,0	0,344
789,0	1,144	830,0	0,948	871,0	0,954	912,0	0,730	953,0	0,415
790,0	1,116	831,0	0,955	872,0	0,967	913,0	0,684	954,0	0,484
791,0	1,124	832,0	0,930	873,0	0,957	914,0	0,680	955,0	0,411
792,0	1,113	833,0	0,978	874,0	0,940	915,0	0,729	956,0	0,390
793,0	1,105	834,0	0,964	875,0	0,927	916,0	0,632	957,0	0,349
794,0	1,107	835,0	1,016	876,0	0,953	917,0	0,769	958,0	0,505
795,0	1,105	836,0	0,997	877,0	0,956	918,0	0,649	959,0	0,432
796,0	1,096	837,0	1,022	878,0	0,952	919,0	0,773	960,0	0,483
797,0	1,113	838,0	1,017	879,0	0,936	920,0	0,770	961,0	0,517
798,0	1,125	839,0	1,013	880,0	0,939	921,0	0,802	962,0	0,498
799,0	1,105	840,0	1,026	881,0	0,909	922,0	0,736	963,0	0,556
800,0	1,089	841,0	1,022	882,0	0,933	923,0	0,765	964,0	0,507
801,0	1,103	842,0	1,006	883,0	0,929	924,0	0,758	965,0	0,549
802,0	1,104	843,0	1,011	884,0	0,933	925,0	0,749	966,0	0,558
803,0	1,085	844,0	0,993	885,0	0,944	926,0	0,739	967,0	0,559
804,0	1,096	845,0	1,021	886,0	0,910	927,0	0,811	968,0	0,675
805,0	1,070	846,0	1,023	887,0	0,911	928,0	0,651	969,0	0,711
806,0	1,108	847,0	0,994	888,0	0,924	929,0	0,619	970,0	0,667
807,0	1,098	848,0	0,996	889,0	0,934	930,0	0,500	971,0	0,728
808,0	1,093	849,0	0,990	890,0	0,926	931,0	0,472	972,0	0,706
809,0	1,069	850,0	0,897	891,0	0,927	932,0	0,368	973,0	0,645
810,0	1,073	851,0	0,980	892,0	0,913	933,0	0,323	974,0	0,615
811,0	1,074	852,0	0,974	893,0	0,883	934,0	0,217	975,0	0,622
812,0	1,054	853,0	0,968	894,0	0,868	935,0	0,316	976,0	0,614
813,0	1,039	854,0	0,855	895,0	0,842	936,0	0,223	977,0	0,664
814,0	0,957	855,0	0,916	896,0	0,798	937,0	0,236	978,0	0,649
815,0	0,948	856,0	0,977	897,0	0,715	938,0	0,281	979,0	0,665
816,0	0,888	857,0	0,994	898,0	0,759	939,0	0,474	980,0	0,637
817,0	0,904	858,0	0,995	899,0	0,604	940,0	0,543	981,0	0,726
818,0	0,879	859,0	0,994	900,0	0,775	941,0	0,451	982,0	0,712
819,0	0,944	860,0	0,990	901,0	0,658	942,0	0,475	983,0	0,692
820,0	0,908	861,0	0,988	902,0	0,706	943,0	0,350	984,0	0,742
821,0	1,020	862,0	0,996	903,0	0,734	944,0	0,343	985,0	0,707
822,0	0,978	863,0	1,002	904,0	0,862	945,0	0,439	986,0	0,751
823,0	0,740	864,0	0,980	905,0	0,840	946,0	0,259	987,0	0,744
824,0	0,970	865,0	0,964	906,0	0,803	947,0	0,445	988,0	0,740
825,0	0,993	866,0	0,850	907,0	0,688	948,0	0,339	989,0	0,746
990,0	0,736	1031,0	0,683	1072,0	0,616	1113,0	0,315	1154,0	0,200
991,0	0,751	1032,0	0,683	1073,0	0,604	1114,0	0,345	1155,0	0,353
992,0	0,748	1033,0	0,672	1074,0	0,620	1115,0	0,288	1156,0	0,322

Table 1 *(continued)*

Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)
993,0	0,739	1034,0	0,676	1075,0	0,596	1116,0	0,250	1157,0	0,353
994,0	0,750	1035,0	0,678	1076,0	0,613	1117,0	0,128	1158,0	0,345
995,0	0,747	1036,0	0,678	1077,0	0,606	1118,0	0,266	1159,0	0,368
996,0	0,745	1037,0	0,671	1078,0	0,606	1119,0	0,154	1160,0	0,330
997,0	0,736	1038,0	0,668	1079,0	0,602	1120,0	0,193	1161,0	0,381
998,0	0,735	1039,0	0,672	1080,0	0,599	1121,0	0,244	1162,0	0,385
999,0	0,735	1040,0	0,668	1081,0	0,585	1122,0	0,123	1163,0	0,484
1000,0	0,733	1041,0	0,668	1082,0	0,589	1123,0	0,178	1164,0	0,428
1001,0	0,740	1042,0	0,668	1083,0	0,596	1124,0	0,150	1165,0	0,420
1002,0	0,729	1043,0	0,661	1084,0	0,584	1125,0	0,197	1166,0	0,403
1003,0	0,731	1044,0	0,665	1085,0	0,594	1126,0	0,088	1167,0	0,434
1004,0	0,721	1045,0	0,661	1086,0	0,564	1127,0	0,214	1168,0	0,444
1005,0	0,678	1046,0	0,644	1087,0	0,570	1128,0	0,154	1169,0	0,444
1006,0	0,709	1047,0	0,653	1088,0	0,592	1129,0	0,161	1170,0	0,474
1007,0	0,724	1048,0	0,659	1089,0	0,583	1130,0	0,120	1171,0	0,465
1008,0	0,724	1049,0	0,656	1090,0	0,564	1131,0	0,356	1172,0	0,469
1009,0	0,718	1050,0	0,652	1091,0	0,589	1132,0	0,288	1173,0	0,472
1010,0	0,718	1051,0	0,652	1092,0	0,581	1133,0	0,208	1174,0	0,372
1011,0	0,719	1052,0	0,649	1093,0	0,527	1134,0	0,070	1175,0	0,465
1012,0	0,716	1053,0	0,647	1094,0	0,541	1135,0	0,028	1176,0	0,481
1013,0	0,713	1054,0	0,644	1095,0	0,534	1136,0	0,185	1177,0	0,482
1014,0	0,716	1055,0	0,646	1096,0	0,521	1137,0	0,349	1178,0	0,387
1015,0	0,704	1056,0	0,645	1097,0	0,578	1138,0	0,256	1179,0	0,487
1016,0	0,707	1057,0	0,643	1098,0	0,522	1139,0	0,344	1180,0	0,456
1017,0	0,699	1058,0	0,637	1099,0	0,525	1140,0	0,306	1181,0	0,468
1018,0	0,710	1059,0	0,618	1100,0	0,510	1141,0	0,248	1182,0	0,350
1019,0	0,686	1060,0	0,635	1101,0	0,520	1142,0	0,278	1183,0	0,449
1020,0	0,695	1061,0	0,621	1102,0	0,494	1143,0	0,364	1184,0	0,437
1021,0	0,697	1062,0	0,632	1103,0	0,495	1144,0	0,158	1185,0	0,429
1022,0	0,686	1063,0	0,622	1104,0	0,495	1145,0	0,202	1186,0	0,484
1023,0	0,691	1064,0	0,632	1105,0	0,525	1146,0	0,216	1187,0	0,468
1024,0	0,689	1065,0	0,629	1106,0	0,441	1147,0	0,100	1188,0	0,367
1025,0	0,693	1066,0	0,617	1107,0	0,505	1148,0	0,317	1189,0	0,428
1026,0	0,692	1067,0	0,620	1108,0	0,452	1149,0	0,269	1190,0	0,470
1027,0	0,689	1068,0	0,620	1109,0	0,448	1150,0	0,168	1191,0	0,462
1028,0	0,690	1069,0	0,586	1110,0	0,504	1151,0	0,252	1192,0	0,480
1029,0	0,682	1070,0	0,605	1111,0	0,366	1152,0	0,297	1193,0	0,464
1030,0	0,686	1071,0	0,616	1112,0	0,448	1153,0	0,276	1194,0	0,476
1195,0	0,460	1236,0	0,465	1277,0	0,423	1318,0	0,344	1359,0	0,000
1196,0	0,448	1237,0	0,461	1278,0	0,428	1319,0	0,294	1360,0	0,000
1197,0	0,481	1238,0	0,463	1279,0	0,425	1320,0	0,280	1361,0	0,000
1198,0	0,443	1239,0	0,458	1280,0	0,422	1321,0	0,317	1362,0	0,000

Table 1 *(continued)*

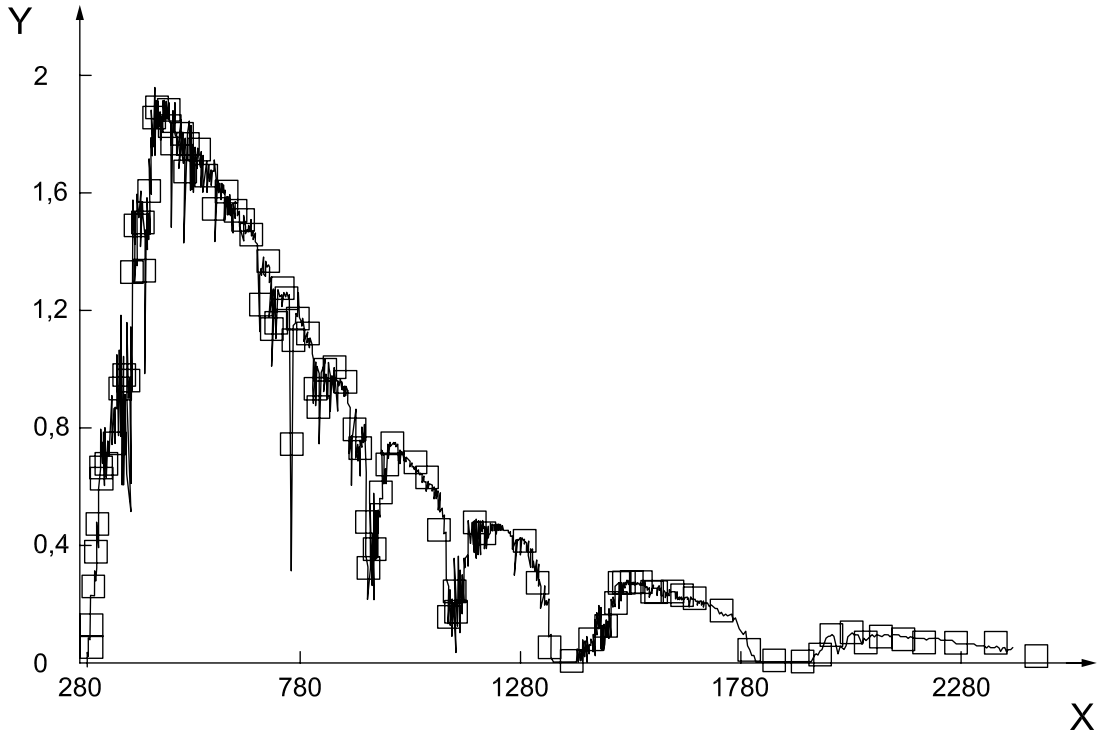
Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)
1199,0	0,387	1240,0	0,456	1281,0	0,413	1322,0	0,322	1363,0	0,000
1200,0	0,458	1241,0	0,459	1282,0	0,370	1323,0	0,262	1364,0	0,000
1201,0	0,451	1242,0	0,458	1283,0	0,405	1324,0	0,287	1365,0	0,000
1202,0	0,449	1243,0	0,453	1284,0	0,419	1325,0	0,336	1366,0	0,000
1203,0	0,446	1244,0	0,451	1285,0	0,421	1326,0	0,302	1367,0	0,000
1204,0	0,385	1245,0	0,452	1286,0	0,423	1327,0	0,289	1368,0	0,000
1205,0	0,447	1246,0	0,455	1287,0	0,421	1328,0	0,256	1369,0	0,000
1206,0	0,482	1247,0	0,453	1288,0	0,418	1329,0	0,208	1370,0	0,000
1207,0	0,444	1248,0	0,455	1289,0	0,411	1330,0	0,262	1371,0	0,000
1208,0	0,443	1249,0	0,456	1290,0	0,411	1331,0	0,181	1372,0	0,000
1209,0	0,423	1250,0	0,453	1291,0	0,415	1332,0	0,178	1373,0	0,001
1210,0	0,459	1251,0	0,450	1292,0	0,400	1333,0	0,241	1374,0	0,002
1211,0	0,432	1252,0	0,447	1293,0	0,411	1334,0	0,200	1375,0	0,002
1212,0	0,440	1253,0	0,445	1294,0	0,404	1335,0	0,259	1376,0	0,002
1213,0	0,472	1254,0	0,443	1295,0	0,406	1336,0	0,213	1377,0	0,001
1214,0	0,446	1255,0	0,447	1296,0	0,395	1337,0	0,195	1378,0	0,006
1215,0	0,441	1256,0	0,440	1297,0	0,380	1338,0	0,206	1379,0	0,000
1216,0	0,468	1257,0	0,436	1298,0	0,394	1339,0	0,206	1380,0	0,001
1217,0	0,460	1258,0	0,443	1299,0	0,407	1340,0	0,191	1381,0	0,000
1218,0	0,463	1259,0	0,430	1300,0	0,364	1341,0	0,202	1382,0	0,000
1219,0	0,453	1260,0	0,433	1301,0	0,372	1342,0	0,216	1383,0	0,000
1220,0	0,462	1261,0	0,420	1302,0	0,393	1343,0	0,158	1384,0	0,000
1221,0	0,467	1262,0	0,407	1303,0	0,357	1344,0	0,103	1385,0	0,000
1222,0	0,455	1263,0	0,412	1304,0	0,322	1345,0	0,139	1386,0	0,000
1223,0	0,449	1264,0	0,390	1305,0	0,387	1346,0	0,088	1387,0	0,002
1224,0	0,454	1265,0	0,407	1306,0	0,388	1347,0	0,094	1388,0	0,000
1225,0	0,464	1266,0	0,401	1307,0	0,325	1348,0	0,012	1389,0	0,004
1226,0	0,467	1267,0	0,401	1308,0	0,355	1349,0	0,036	1390,0	0,003
1227,0	0,439	1268,0	0,387	1309,0	0,388	1350,0	0,032	1391,0	0,003
1228,0	0,465	1269,0	0,296	1310,0	0,321	1351,0	0,014	1392,0	0,000
1229,0	0,466	1270,0	0,401	1311,0	0,346	1352,0	0,006	1393,0	0,001
1230,0	0,461	1271,0	0,415	1312,0	0,346	1353,0	0,001	1394,0	0,001
1231,0	0,469	1272,0	0,415	1313,0	0,329	1354,0	0,002	1395,0	0,000
1232,0	0,463	1273,0	0,413	1314,0	0,308	1355,0	0,000	1396,0	0,000
1233,0	0,456	1274,0	0,412	1315,0	0,308	1356,0	0,000	1397,0	0,000
1234,0	0,466	1275,0	0,417	1316,0	0,338	1357,0	0,001	1398,0	0,007
1235,0	0,461	1276,0	0,421	1317,0	0,327	1358,0	0,000	1399,0	0,004
1400,0	0,000	1441,0	0,056	1482,0	0,079	1523,0	0,280	1564,0	0,261
1401,0	0,000	1442,0	0,059	1483,0	0,178	1524,0	0,277	1565,0	0,265
1402,0	0,008	1443,0	0,064	1484,0	0,162	1525,0	0,263	1566,0	0,261
1403,0	0,010	1444,0	0,089	1485,0	0,153	1526,0	0,272	1567,0	0,262
1404,0	0,003	1445,0	0,075	1486,0	0,151	1527,0	0,266	1568,0	0,257

Table 1 *(continued)*

Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)
1405,0	0,000	1446,0	0,034	1487,0	0,087	1528,0	0,279	1569,0	0,256
1406,0	0,009	1447,0	0,060	1488,0	0,117	1529,0	0,274	1570,0	0,246
1407,0	0,001	1448,0	0,147	1489,0	0,216	1530,0	0,258	1571,0	0,244
1408,0	0,007	1449,0	0,138	1490,0	0,192	1531,0	0,272	1572,0	0,245
1409,0	0,003	1450,0	0,047	1491,0	0,212	1532,0	0,278	1573,0	0,242
1410,0	0,002	1451,0	0,020	1492,0	0,190	1533,0	0,277	1574,0	0,247
1411,0	0,008	1452,0	0,092	1493,0	0,206	1534,0	0,269	1575,0	0,241
1412,0	0,009	1453,0	0,116	1494,0	0,224	1535,0	0,269	1576,0	0,250
1413,0	0,048	1454,0	0,170	1495,0	0,204	1536,0	0,275	1577,0	0,221
1414,0	0,002	1455,0	0,092	1496,0	0,190	1537,0	0,274	1578,0	0,241
1415,0	0,001	1456,0	0,123	1497,0	0,239	1538,0	0,271	1579,0	0,243
1416,0	0,061	1457,0	0,150	1498,0	0,210	1539,0	0,273	1580,0	0,249
1417,0	0,026	1458,0	0,163	1499,0	0,235	1540,0	0,265	1581,0	0,252
1418,0	0,029	1459,0	0,195	1500,0	0,261	1541,0	0,269	1582,0	0,244
1419,0	0,005	1460,0	0,114	1501,0	0,274	1542,0	0,270	1583,0	0,249
1420,0	0,017	1461,0	0,122	1502,0	0,246	1543,0	0,271	1584,0	0,249
1421,0	0,023	1462,0	0,162	1503,0	0,203	1544,0	0,272	1585,0	0,258
1422,0	0,073	1463,0	0,066	1504,0	0,183	1545,0	0,276	1586,0	0,255
1423,0	0,018	1464,0	0,184	1505,0	0,201	1546,0	0,274	1587,0	0,252
1424,0	0,034	1465,0	0,116	1506,0	0,264	1547,0	0,272	1588,0	0,249
1425,0	0,047	1466,0	0,095	1507,0	0,263	1548,0	0,265	1589,0	0,230
1426,0	0,044	1467,0	0,062	1508,0	0,252	1549,0	0,272	1590,0	0,240
1427,0	0,070	1468,0	0,108	1509,0	0,206	1550,0	0,268	1591,0	0,240
1428,0	0,014	1469,0	0,128	1510,0	0,275	1551,0	0,269	1592,0	0,251
1429,0	0,057	1470,0	0,071	1511,0	0,272	1552,0	0,271	1593,0	0,256
1430,0	0,089	1471,0	0,033	1512,0	0,266	1553,0	0,270	1594,0	0,254
1431,0	0,078	1472,0	0,068	1513,0	0,253	1554,0	0,263	1595,0	0,256
1432,0	0,009	1473,0	0,100	1514,0	0,240	1555,0	0,266	1596,0	0,243
1433,0	0,058	1474,0	0,124	1515,0	0,270	1556,0	0,261	1597,0	0,246
1434,0	0,034	1475,0	0,211	1516,0	0,263	1557,0	0,269	1598,0	0,253
1435,0	0,042	1476,0	0,093	1517,0	0,258	1558,0	0,267	1599,0	0,243
1436,0	0,066	1477,0	0,097	1518,0	0,260	1559,0	0,266	1600,0	0,241
1437,0	0,052	1478,0	0,086	1519,0	0,254	1560,0	0,264	1601,0	0,229
1438,0	0,028	1479,0	0,147	1520,0	0,270	1561,0	0,268	1602,0	0,230
1439,0	0,080	1480,0	0,085	1521,0	0,275	1562,0	0,266	1603,0	0,230
1440,0	0,064	1481,0	0,143	1522,0	0,267	1563,0	0,265	1604,0	0,234
1605,0	0,238	1646,0	0,220	1687,0	0,205	1835,0	0,000	2040,0	0,095
1606,0	0,242	1647,0	0,226	1688,0	0,209	1840,0	0,000	2045,0	0,096
1607,0	0,235	1648,0	0,219	1689,0	0,206	1845,0	0,000	2050,0	0,079
1608,0	0,235	1649,0	0,219	1690,0	0,205	1850,0	0,000	2055,0	0,068
1609,0	0,232	1650,0	0,225	1691,0	0,197	1855,0	0,000	2060,0	0,079
1610,0	0,221	1651,0	0,212	1692,0	0,207	1860,0	0,000	2065,0	0,073

Table 1 *(continued)*

Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)
1611,0	0,230	1652,0	0,223	1693,0	0,210	1865,0	0,000	2070,0	0,076
1612,0	0,232	1653,0	0,222	1694,0	0,205	1870,0	0,000	2075,0	0,084
1613,0	0,238	1654,0	0,218	1695,0	0,209	1875,0	0,000	2080,0	0,090
1614,0	0,238	1655,0	0,221	1696,0	0,208	1880,0	0,001	2085,0	0,089
1615,0	0,240	1656,0	0,221	1697,0	0,187	1885,0	0,000	2090,0	0,092
1616,0	0,229	1657,0	0,222	1698,0	0,206	1890,0	0,001	2095,0	0,091
1617,0	0,234	1658,0	0,223	1699,0	0,205	1895,0	0,001	2100,0	0,089
1618,0	0,242	1659,0	0,220	1700,0	0,200	1900,0	0,000	2105,0	0,094
1619,0	0,240	1660,0	0,222	1702,0	0,203	1905,0	0,000	2110,0	0,091
1620,0	0,233	1661,0	0,223	1705,0	0,198	1910,0	0,000	2115,0	0,092
1621,0	0,232	1662,0	0,219	1710,0	0,190	1915,0	0,000	2120,0	0,089
1622,0	0,236	1663,0	0,221	1715,0	0,191	1920,0	0,002	2125,0	0,090
1623,0	0,240	1664,0	0,220	1720,0	0,188	1925,0	0,003	2130,0	0,090
1624,0	0,241	1665,0	0,213	1725,0	0,181	1930,0	0,002	2135,0	0,090
1625,0	0,236	1666,0	0,190	1730,0	0,177	1935,0	0,009	2140,0	0,091
1626,0	0,238	1667,0	0,212	1735,0	0,165	1940,0	0,007	2145,0	0,089
1627,0	0,239	1668,0	0,214	1740,0	0,172	1945,0	0,019	2150,0	0,086
1628,0	0,240	1669,0	0,215	1745,0	0,160	1950,0	0,026	2155,0	0,086
1629,0	0,239	1670,0	0,220	1750,0	0,169	1955,0	0,018	2160,0	0,085
1630,0	0,235	1671,0	0,218	1755,0	0,158	1960,0	0,033	2165,0	0,078
1631,0	0,237	1672,0	0,210	1760,0	0,164	1965,0	0,042	2170,0	0,083
1632,0	0,237	1673,0	0,215	1765,0	0,141	1970,0	0,063	2175,0	0,082
1633,0	0,232	1674,0	0,215	1770,0	0,150	1975,0	0,079	2180,0	0,082
1634,0	0,231	1675,0	0,213	1775,0	0,126	1980,0	0,083	2185,0	0,077
1635,0	0,233	1676,0	0,210	1780,0	0,114	1985,0	0,089	2190,0	0,080
1636,0	0,234	1677,0	0,212	1785,0	0,092	1990,0	0,093	2195,0	0,080
1637,0	0,225	1678,0	0,210	1790,0	0,105	1995,0	0,089	2200,0	0,074
1638,0	0,221	1679,0	0,212	1795,0	0,061	2000,0	0,054	2205,0	0,076
1639,0	0,219	1680,0	0,204	1800,0	0,041	2005,0	0,029	2210,0	0,080
1640,0	0,217	1681,0	0,194	1805,0	0,022	2010,0	0,056	2215,0	0,077
1641,0	0,219	1682,0	0,202	1810,0	0,018	2015,0	0,042	2220,0	0,078
1642,0	0,220	1683,0	0,208	1815,0	0,007	2020,0	0,060	2225,0	0,076
1643,0	0,218	1684,0	0,201	1820,0	0,003	2025,0	0,084	2230,0	0,076
1644,0	0,223	1685,0	0,212	1825,0	0,004	2030,0	0,092	2235,0	0,075
1645,0	0,219	1686,0	0,209	1830,0	0,000	2035,0	0,100	2240,0	0,074
2245,0	0,072	2280,0	0,068	2310,0	0,065	2345,0	0,055	2380,0	0,047
2250,0	0,073	2285,0	0,066	2315,0	0,061	2350,0	0,047	2385,0	0,036
2255,0	0,070	2290,0	0,066	2320,0	0,056	2355,0	0,052	2390,0	0,042
2260,0	0,069	2295,0	0,064	2325,0	0,059	2360,0	0,054	2395,0	0,045
2265,0	0,070	2300,0	0,062	2330,0	0,060	2365,0	0,053	2400,0	0,048
2270,0	0,067	2280,0	0,068	2335,0	0,060	2370,0	0,038		
2275,0	0,067	2305,0	0,062	2340,0	0,051	2375,0	0,049		



Key

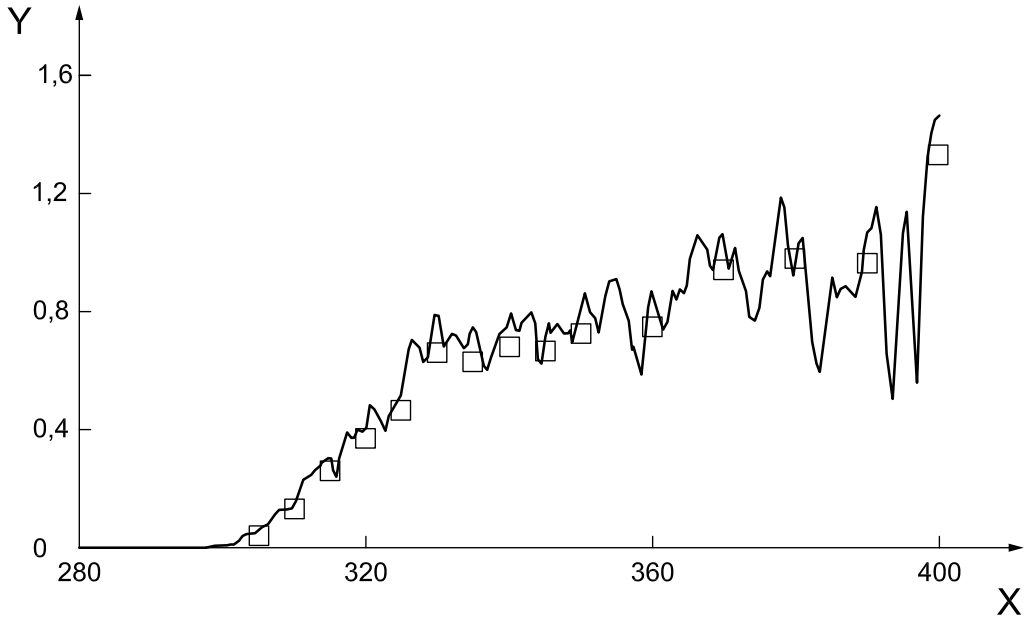
X wavelength in nm

Y spectral irradiance in ($W \cdot m^{-2} \cdot nm^{-1}$)

— with SMART2 recalculated CIE No. 85, Table 4

□ original data from CIE No. 85, Table 4

Figure 2 — Reference global solar spectral irradiance listed in Table 1 and global solar spectral irradiance according CIE No. 85, Table 4 listed in Table 2



Key

X wavelength in nm

Y spectral irradiance in ($W \cdot m^{-2} \cdot nm^{-1}$)

— with SMART2 recalculated CIE No. 85, Table 4

□ original data from CIE No. 85, Table 4

Figure 3 — Reference global solar UV spectral irradiance listed in Table 1 and global solar UV spectral irradiance according CIE No. 85, Table 4 listed in Table 2

Table 2 — Global solar irradiance according to CIE No. 85, Table 4

Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)	Wave-length (nm)	Spectral irradiance ($W \cdot m^{-2} \cdot nm^{-1}$)
305,0	0,0470	470,0	1,8476	757,5	1,2267	1070,0	0,6338	1610,0	0,2315
310,0	0,1325	480,0	1,8876	762,5	0,7509	1100,0	0,4529	1630,0	0,2421
315,0	0,2583	490,0	1,7695	767,5	1,0957	1120,0	0,1507	1646,0	0,2326
320,0	0,3747	500,0	1,7696	780,0	1,1733	1130,0	0,2350	1678,0	0,2183
325,0	0,4663	510,0	1,8020	800,0	1,1252	1137,0	0,1693	1740,0	0,1734
330,0	0,6600	520,0	1,6783	816,0	0,9304	1161,0	0,3766	1800,0	0,0418
335,0	0,6271	530,0	1,7714	823,7	0,8714	1180,0	0,4749	1860,0	0,0042
340,0	0,6793	540,0	1,7403	831,5	0,9716	1200,0	0,4415	1920,0	0,0028
345,0	0,6690	550,0	1,7472	840,0	0,9994	1290,0	0,4183	1960,0	0,0292
350,0	0,7230	570,0	1,6544	860,0	1,0074	1320,0	0,2756	1985,0	0,0955
360,0	0,7514	590,0	1,5489	880,0	0,9570	1350,0	0,0520	2005,0	0,0349
370,0	0,9355	610,0	1,6026	905,0	0,7970	1395,0	0,0043	2035,0	0,1002
380,0	0,9759	630,0	1,5414	915,0	0,7297	1442,5	0,0782	2065,0	0,0653
390,0	0,9648	650,0	1,5123	925,0	0,7318	1462,5	0,1296	2100,0	0,0881
400,0	1,3290	670,0	1,4609	930,0	0,4771	1477,0	0,1291	2148,0	0,0804
410,0	1,4921	690,0	1,2147	937,0	0,3267	1497,0	0,2012	2198,0	0,0707
420,0	1,4994	710,0	1,3705	948,0	0,3810	1520,0	0,2684	2270,0	0,0680
430,0	1,3379	718,0	1,1367	965,0	0,5801	1539,0	0,2716	2360,0	0,0612
440,0	1,6038	724,4	1,1610	980,0	0,6764	1558,0	0,2707	2450,0	0,0244
450,0	1,8557	740,0	1,2799	993,5	0,7480	1578,0	0,2457		
460,0	1,8890	752,5	1,2473	1040,0	0,6850	1592,0	0,2454		

Annex A
(informative)

Input file to generate the reference spectrum

Table A.1 — SMARTS Version 2.9.2 input file to generate a recalculated CIE 85, Table 4

Value	Parameter/Description/Variable Name
CIE85 Table 4	Header
1	Pressure input mode (1 = pressure and altitude): ISPR
1013.25 0.	Station Pressure (mbar) and altitude (km): SPR, ALT
1	Standard Atmosphere Profile Selection (1 = use default atmosphere): IATM1
'USSA'	Default Standard Atmosphere Profile: ATM
1	Water Vapor Input (1 = default from Atmospheric Profile): IH2O
1	Ozone Calculation (0 = user input concentration and altitude): IO3
1 0.33	Ozone Altitude correction (IALT = 1 = > correct from sea level),Ozone Concentration (AbO.3 = 0.30 atm cm)
1	Pollution level mode (1 = standard conditions/no pollution): IGAS
370	Carbon Monoxide volume mixing ratio (ppm): qCO2
1	Extraterrestrial Spectrum (1 = SMARTS/Gueymard): ISPCTR
'S&F_RURAL'	Aerosol Profile to Use: AEROS
0	Specification for aerosol optical depth/turbidity input (0 = AOD at 500 nm): ITURB
0.1	Aerosol Optical Depth at 500 nm: TAU5
0.2	Far field Spectral Albedo file to use (38 = Light Sandy Soil): IALBDX
1	Specify tilt calculation (1 = yes): ITILT
–1 0 180	Albedo and Tilt variables—Albedo file to use for near field, Tilt, and Azimuth: IALBDG, TILT, WAZIM
285 2400 0.5 1367.0	Wavelength Range—start, stop, mean radius vector correction, integrated solar spectrum irradiance: WLMN, WLMX, SUNCOR,SOLARC
2	Separate spectral output file print mode (2 = yes): IPRT
285 400 0.5	Output file wavelength-Print limits, start, stop, minimum step size: WPMN, WPMX, INTVL
2	Number of output variables to print: IOTOT
2 4	Code relating output variables to print [8 = Hemispherical tilt, OUT(8)]
1	Circumsolar calculation mode (1 = yes): ICIRC
0 2.9 0	Receiver geometry-Slope, View, Limit half angles: SLOPE, APERT, LIMIT
0	Smooth function mode (0 = none): ISCAN
0	Illuminance calculation mode (0 = none): ILLUM
0	UV calculation mode (0 = none): IUV
2	Solar Geometry mode (2 = Air Mass): IMASS
1.0	Air mass value: AMASS

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[3] Gueymard C. *"SMARTS22, A Simple Model of the Atmospheric Radiative Transfer of Sunshine: Algorithms and Performance Assessment," Professional Paper FSEC-PF-270-95. Florida Solar Energy Center, 1679 Clearlake Road*. Cocoa, FL 32922, 1995

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