PRELIMINARY

Soraa Internal Report: IES LM79-08

Test results reported for:

Customer Reference P/N: SP30S-18-09D-830-03
Manufacturing P/N: SP30S-18-09D-830-03

Soraa PAR30S, E26/120V, 3000K, 80CRI, 18.5W, 9 degree

Relevant Standards
IES LM-79
ANSI C78.377
IES PR-16

Soraa Lamp Lab

6500 Kaiser Dr., Fremont, CA 94555 TEL: (510) 456-2200

1.0 Description of test sample

Customer reference ID	SP30S-18-09D-830-03
Manufacturer reference ID	SP30S-18-09D-830-03
Lamp description	Brilliant 3000K 80CRI 18.5W 9 degree
Rated voltage	120V
Rated power	18.5W
Nominal CCT	3000K

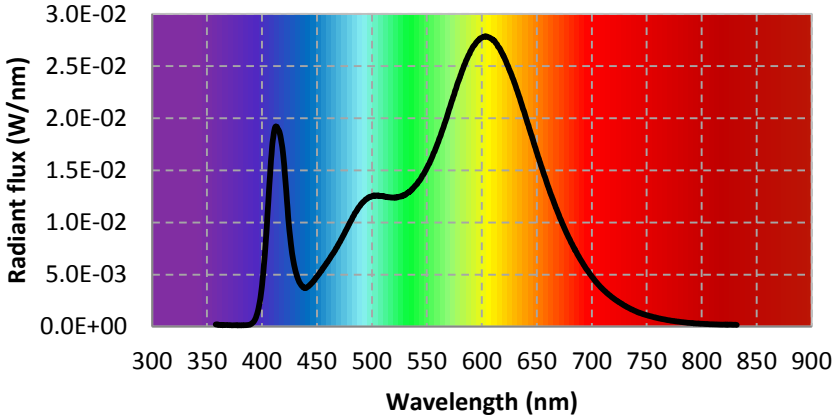
2.0 Results - Sphere Measurements

Test conditions	
Orientation	Horizontal
Stabilization time (min)	50-55
Correction factor applied	Self absorption correction
Sphere geometry	65" Sphere
	95% coating reflectance
	2pi geometry
Ambient temperature (°C)	25±1

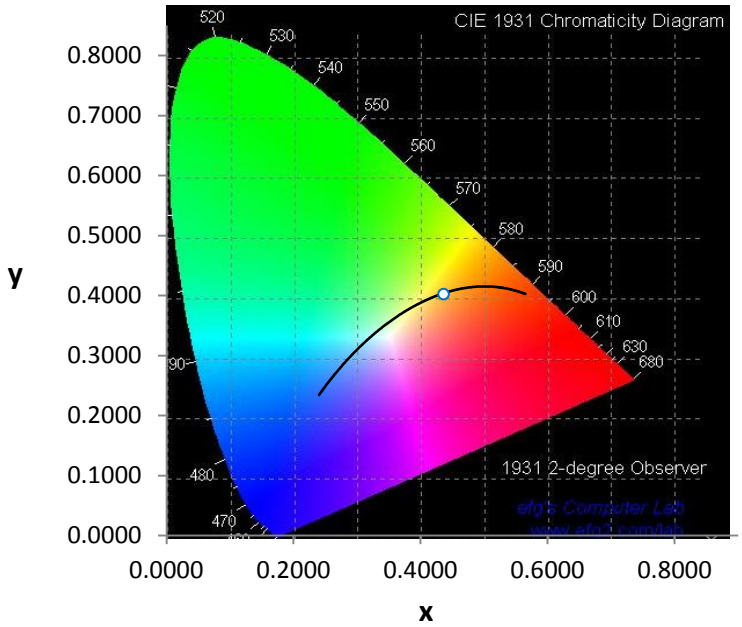
Instrument				
	Instrument	Manufacture	Model	
Photometric	Spectrometer	Instrument systems	CAS 140T	
	Integrating sphere	Labsphere	65"	
	Standard lamp	Labsphere	CSFS-1400 lamp	
Electrical instrument	Power supply for standard lamp	Labsphere	LPS-150-0268	
	Power supply for aux lamp	Labsphere	LPS-100-0833	
	Power supply for test lamps	APT	Variplus 105	
	Power meter for test lamps	Chroma	66202	
Thermometer	Digital multimeter	YOKOGAWA	TY720	

Measurement results				
Photometric			Electrical	
Total lumen (lm)	1236		Input voltage (V)	119.6
Luminous efficacy (lm/W)	69		Current (A)	0.152
Chromaticity coordinates	u' = 0.2515		Power (W)	18.0
	v' = 0.5205		pf	0.989
	x = 0.4369			
	y = 0.4019			
CCT (K)	3000			
CRI	86			
R9	16			
Duv				

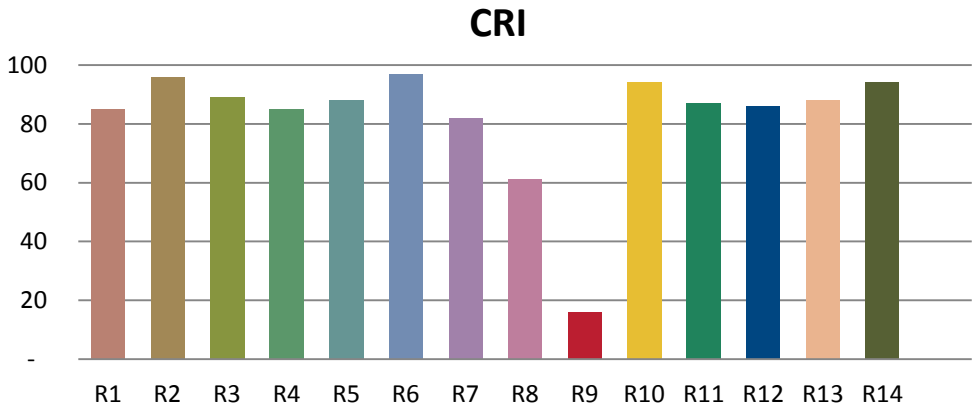
Spectral power distribution



Chromaticity on CIE1931



CRI	
R1	85
R2	96
R3	89
R4	85
R5	88
R6	97
R7	82
R8	61
R9	16
R10	94
R11	87
R12	86
R13	88
R14	94
Ra	86



Spectral Power Distribution									
WL (nm)	SPD(W/nm)	WL (nm)	SPD(W/nm)	WL (nm)	SPD(W/nm)	WL (nm)	SPD(W/nm)	WL (nm)	SPD(W/nm)
380	1.32E-04	421	1.44E-02	462	6.60E-03	503	1.26E-02	544	1.41E-02
381	1.30E-04	422	1.31E-02	463	6.77E-03	504	1.25E-02	545	1.43E-02
382	1.36E-04	423	1.17E-02	464	6.94E-03	505	1.26E-02	546	1.45E-02
383	1.30E-04	424	1.03E-02	465	7.07E-03	506	1.26E-02	547	1.46E-02
384	1.39E-04	425	9.16E-03	466	7.24E-03	507	1.26E-02	548	1.48E-02
385	1.42E-04	426	8.22E-03	467	7.43E-03	508	1.25E-02	549	1.50E-02
386	1.50E-04	427	7.33E-03	468	7.60E-03	509	1.25E-02	550	1.52E-02
387	1.57E-04	428	6.63E-03	469	7.81E-03	510	1.25E-02	551	1.54E-02
388	1.77E-04	429	6.04E-03	470	7.99E-03	511	1.25E-02	552	1.56E-02
389	1.93E-04	430	5.56E-03	471	8.15E-03	512	1.25E-02	553	1.59E-02
390	2.49E-04	431	5.14E-03	472	8.38E-03	513	1.25E-02	554	1.61E-02
391	3.36E-04	432	4.79E-03	473	8.56E-03	514	1.25E-02	555	1.63E-02
392	4.27E-04	433	4.51E-03	474	8.75E-03	515	1.24E-02	556	1.66E-02
393	5.71E-04	434	4.26E-03	475	8.95E-03	516	1.24E-02	557	1.68E-02
394	7.67E-04	435	4.10E-03	476	9.18E-03	517	1.24E-02	558	1.71E-02
395	1.05E-03	436	3.95E-03	477	9.37E-03	518	1.24E-02	559	1.74E-02
396	1.39E-03	437	3.82E-03	478	9.57E-03	519	1.24E-02	560	1.76E-02
397	1.85E-03	438	3.75E-03	479	9.79E-03	520	1.24E-02	561	1.80E-02
398	2.40E-03	439	3.73E-03	480	1.00E-02	521	1.24E-02	562	1.82E-02
399	3.11E-03	440	3.71E-03	481	1.02E-02	522	1.24E-02	563	1.85E-02
400	3.96E-03	441	3.79E-03	482	1.04E-02	523	1.24E-02	564	1.88E-02
401	5.01E-03	442	3.86E-03	483	1.06E-02	524	1.25E-02	565	1.91E-02
402	6.23E-03	443	3.94E-03	484	1.08E-02	525	1.25E-02	566	1.95E-02
403	7.56E-03	444	4.04E-03	485	1.10E-02	526	1.25E-02	567	1.97E-02
404	9.02E-03	445	4.15E-03	486	1.11E-02	527	1.25E-02	568	2.01E-02
405	1.08E-02	446	4.26E-03	487	1.13E-02	528	1.26E-02	569	2.04E-02
406	1.25E-02	447	4.40E-03	488	1.14E-02	529	1.26E-02	570	2.08E-02
407	1.41E-02	448	4.52E-03	489	1.16E-02	530	1.27E-02	571	2.11E-02
408	1.57E-02	449	4.67E-03	490	1.17E-02	531	1.27E-02	572	2.14E-02
409	1.70E-02	450	4.81E-03	491	1.19E-02	532	1.28E-02	573	2.17E-02
410	1.80E-02	451	4.95E-03	492	1.20E-02	533	1.29E-02	574	2.21E-02
411	1.87E-02	452	5.07E-03	493	1.21E-02	534	1.29E-02	575	2.24E-02
412	1.91E-02	453	5.24E-03	494	1.22E-02	535	1.30E-02	576	2.27E-02
413	1.92E-02	454	5.35E-03	495	1.22E-02	536	1.31E-02	577	2.30E-02
414	1.90E-02	455	5.56E-03	496	1.23E-02	537	1.32E-02	578	2.34E-02
415	1.89E-02	456	5.68E-03	497	1.24E-02	538	1.34E-02	579	2.36E-02
416	1.86E-02	457	5.83E-03	498	1.25E-02	539	1.35E-02	580	2.39E-02
417	1.81E-02	458	5.97E-03	499	1.25E-02	540	1.36E-02	581	2.42E-02
418	1.75E-02	459	6.14E-03	500	1.25E-02	541	1.37E-02	582	2.45E-02
419	1.67E-02	460	6.28E-03	501	1.26E-02	542	1.39E-02	583	2.48E-02
420	1.57E-02	461	6.44E-03	502	1.26E-02	543	1.40E-02	584	2.51E-02

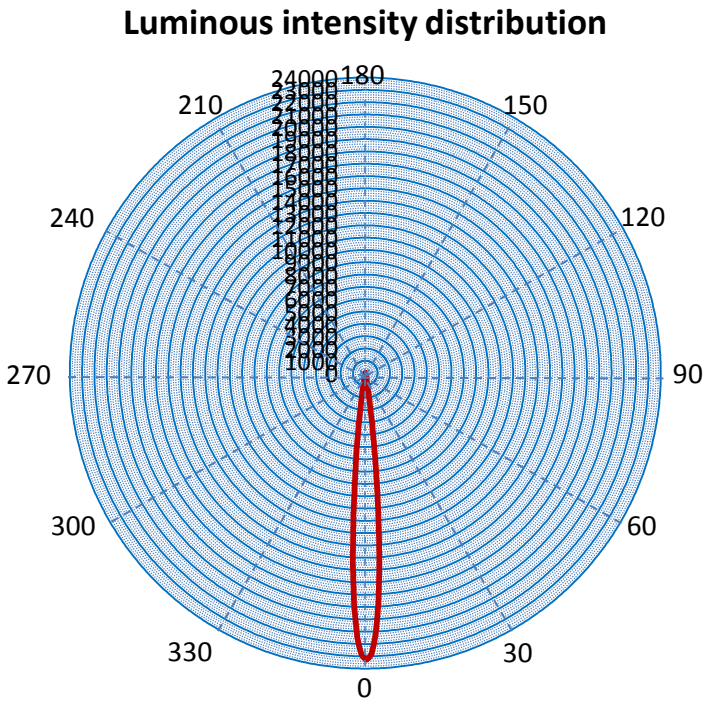
Spectral Power Distribution									
WL (nm)	SPD(W/nm)	WL (nm)	SPD(W/nm)	WL (nm)	SPD(W/nm)	WL (nm)	SPD(W/nm)	WL (nm)	SPD(W/nm)
585	2.53E-02	626	2.44E-02	667	1.15E-02	708	3.81E-03	749	1.13E-03
586	2.56E-02	627	2.42E-02	668	1.13E-02	709	3.71E-03	750	1.10E-03
587	2.58E-02	628	2.39E-02	669	1.10E-02	710	3.59E-03	751	1.08E-03
588	2.61E-02	629	2.36E-02	670	1.07E-02	711	3.50E-03	752	1.04E-03
589	2.62E-02	630	2.33E-02	671	1.05E-02	712	3.40E-03	753	1.01E-03
590	2.65E-02	631	2.30E-02	672	1.02E-02	713	3.30E-03	754	9.86E-04
591	2.67E-02	632	2.27E-02	673	9.96E-03	714	3.20E-03	755	9.57E-04
592	2.69E-02	633	2.24E-02	674	9.73E-03	715	3.12E-03	756	9.27E-04
593	2.70E-02	634	2.21E-02	675	9.48E-03	716	3.03E-03	757	8.99E-04
594	2.71E-02	635	2.17E-02	676	9.25E-03	717	2.95E-03	758	8.67E-04
595	2.73E-02	636	2.14E-02	677	9.01E-03	718	2.86E-03	759	8.47E-04
596	2.74E-02	637	2.11E-02	678	8.79E-03	719	2.79E-03	760	8.29E-04
597	2.75E-02	638	2.08E-02	679	8.56E-03	720	2.70E-03	761	7.95E-04
598	2.76E-02	639	2.05E-02	680	8.37E-03	721	2.62E-03	762	7.75E-04
599	2.77E-02	640	2.01E-02	681	8.12E-03	722	2.54E-03	763	7.51E-04
600	2.77E-02	641	1.97E-02	682	7.95E-03	723	2.48E-03	764	7.30E-04
601	2.78E-02	642	1.94E-02	683	7.72E-03	724	2.41E-03	765	7.15E-04
602	2.78E-02	643	1.91E-02	684	7.53E-03	725	2.33E-03	766	6.98E-04
603	2.78E-02	644	1.87E-02	685	7.32E-03	726	2.27E-03	767	6.71E-04
604	2.78E-02	645	1.84E-02	686	7.15E-03	727	2.20E-03	768	6.50E-04
605	2.78E-02	646	1.81E-02	687	6.93E-03	728	2.14E-03	769	6.28E-04
606	2.78E-02	647	1.77E-02	688	6.76E-03	729	2.07E-03	770	6.16E-04
607	2.77E-02	648	1.74E-02	689	6.57E-03	730	2.01E-03	771	6.02E-04
608	2.77E-02	649	1.71E-02	690	6.40E-03	731	1.95E-03	772	5.72E-04
609	2.76E-02	650	1.67E-02	691	6.23E-03	732	1.89E-03	773	5.61E-04
610	2.75E-02	651	1.64E-02	692	6.06E-03	733	1.84E-03	774	5.49E-04
611	2.75E-02	652	1.61E-02	693	5.88E-03	734	1.78E-03	775	5.33E-04
612	2.73E-02	653	1.58E-02	694	5.71E-03	735	1.72E-03	776	5.22E-04
613	2.72E-02	654	1.54E-02	695	5.55E-03	736	1.66E-03	777	5.00E-04
614	2.71E-02	655	1.51E-02	696	5.41E-03	737	1.63E-03	778	4.84E-04
615	2.68E-02	656	1.48E-02	697	5.27E-03	738	1.57E-03	779	4.83E-04
616	2.68E-02	657	1.45E-02	698	5.10E-03	739	1.52E-03	780	4.61E-04
617	2.66E-02	658	1.42E-02	699	4.97E-03	740	1.48E-03		
618	2.63E-02	659	1.38E-02	700	4.82E-03	741	1.42E-03		
619	2.61E-02	660	1.35E-02	701	4.69E-03	742	1.38E-03		
620	2.59E-02	661	1.32E-02	702	4.55E-03	743	1.36E-03		
621	2.57E-02	662	1.30E-02	703	4.41E-03	744	1.31E-03		
622	2.55E-02	663	1.26E-02	704	4.28E-03	745	1.28E-03		
623	2.52E-02	664	1.24E-02	705	4.17E-03	746	1.23E-03		
624	2.50E-02	665	1.21E-02	706	4.04E-03	747	1.19E-03		
625	2.47E-02	666	1.18E-02	707	3.93E-03	748	1.16E-03		

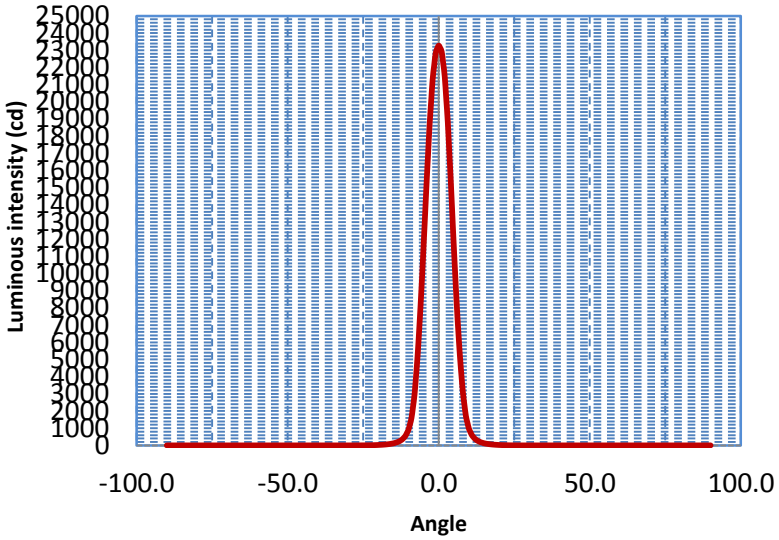
3.0 Results - Goniometric Measurements

Test conditions	
Goniometer distance (m)	1
Temperature (°C)	25±1
Stabilization time (min)	50

Instrument				
	Instrument	Manufacture	Model	
Photometric	Photometer and color meter	Minolta	CL-200A	
Electrical instrument	Power supply for test lamps	APT	Variplus 105	
	Power meter for test lamps	Chroma	66202	
Thermometer	Digital multimeter	YOKOGAWA	TY720	

Measurement results				
Photometric			Electrical	
Central beam candle power(cd)	23270		Input voltage (V)	119.6
Beam Angle (°)	10		Current (A)	0.152
Field Angle (°)	19		Power (W)	18.0260
Chromaticity coordinates	u'= 0.2515		pf	0.9890
	v'= 0.5205			
	x = 0.4369			
	y = 0.4019			
CCT (K)	3000			

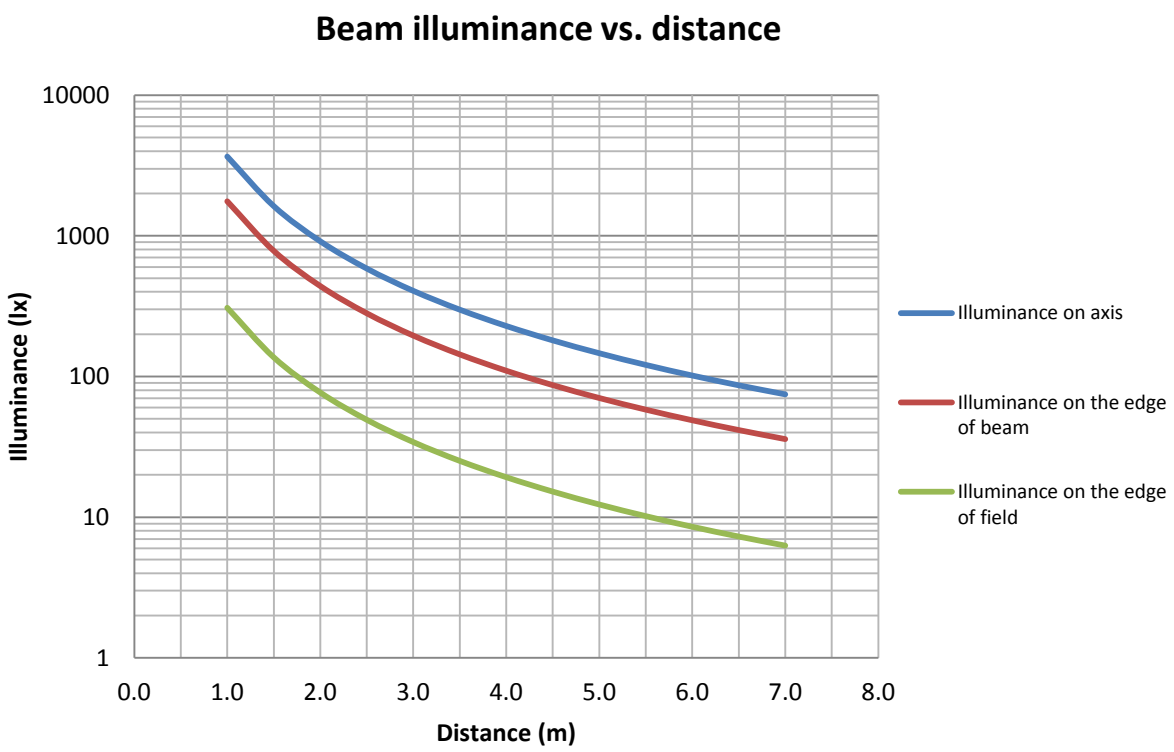

Luminous intensity distribution
180
150
120
90
60
30
0
330
300
270
240
210


Luminous intensity (cd)
25000
24000
23000
22000
21000
20000
19000
18000
17000
16000
15000
14000
13000
12000
11000
10000
9000
8000
7000
6000
5000
4000
3000
2000
1000
0
-100.0
-50.0
0.0
50.0
100.0
Angle

Zonal Lumen Tabulation					
Zones (°)	Lumens	%lamp	Zones (°)	Lumens	%lamp
0-5	719.9	58.3%	45-50	0.0	0.0%
5-10	442.3	35.8%	50-55	0.0	0.0%
10-15	56.0	4.5%	55-60	0.0	0.0%
15-20	14.0	1.1%	60-65	0.0	0.0%
20-25	3.1	0.3%	65-70	0.0	0.0%
25-30	0.5	0.0%	70-75	0.0	0.0%
30-35	0.1	0.0%	75-80	0.0	0.0%
35-40	0.0	0.0%	80-85	0.0	0.0%
40-45	0.0	0.0%	85-90	0.0	0.0%
				Total lumen	1236

Accumulated Zonal Lumen Tabulation					
Zones (°)	Lumens	%lamp	Zones (°)	Lumens	%lamp
0-5	719.9	58.3%	0-50	1235.8	100.0%
0-10	1162.2	94.0%	0-55	1235.8	100.0%
0-15	1218.2	98.6%	0-60	1235.8	100.0%
0-20	1232.2	99.7%	0-65	1235.8	100.0%
0-25	1235.3	100.0%	0-70	1235.8	100.0%
0-30	1235.8	100.0%	0-75	1235.8	100.0%
0-35	1235.8	100.0%	0-80	1235.8	100.0%
0-40	1235.8	100.0%	0-85	1235.8	100.0%
0-45	1235.8	100.0%	0-90	1235.8	100.0%

Center and edge illuminance, beam and field diameter					
Distance (m)	E on axis (lx)	Beam D(m)	E on the edge of beam (lx)	Field D(m)	E on the edge of field (lx)
1.0	3657	0.33	1758	0.7	308
1.5	1626	0.49	781	1.0	137
2.0	914	0.65	440	1.4	77
2.5	585	0.81	281	1.7	49
3.0	406	0.98	195	2.1	34
3.5	299	1.14	144	2.4	25
4.0	229	1.30	110	2.8	19
4.5	181	1.47	87	3.1	15
5.0	146	1.63	70	3.5	12
5.5	121	1.79	58	3.8	10
6.0	102	1.95	49	4.2	9
6.5	87	2.12	42	4.5	7
7.0	75	2.28	36	4.9	6
7.5	65	2.44	31	5.2	5
8.0	57	2.61	27	5.6	5
8.5	51	2.77	24	5.9	4
9.0	45	2.93	22	6.3	4
9.5	41	3.09	19	6.6	3
10.0	37	3.26	18	7.0	3



Luminous Intensity Distribution

Angle (°C)	CP (cd)	Angle (°C)	CP (cd)	Angle (°C)	CP (cd)	Angle (°C)	CP (cd)	Angle (°C)	CP (cd)
-90.0	0.0	-69.5	0.0	-49.0	0.0	-28.5	0.8	-8.0	2962.1
-89.5	0.0	-69.0	0.0	-48.5	0.0	-28.0	1.0	-7.5	4027.4
-89.0	0.0	-68.5	0.0	-48.0	0.0	-27.5	1.3	-7.0	5186.2
-88.5	0.0	-68.0	0.0	-47.5	0.0	-27.0	1.6	-6.5	6613.4
-88.0	0.0	-67.5	0.0	-47.0	0.0	-26.5	2.0	-6.0	8140.3
-87.5	0.0	-67.0	0.0	-46.5	0.0	-26.0	2.5	-5.5	9839.3
-87.0	0.0	-66.5	0.0	-46.0	0.0	-25.5	3.2	-5.0	11625.2
-86.5	0.0	-66.0	0.0	-45.5	0.0	-25.0	3.9	-4.5	13446.7
-86.0	0.0	-65.5	0.0	-45.0	0.0	-24.5	4.8	-4.0	15325.3
-85.5	0.0	-65.0	0.0	-44.5	0.0	-24.0	5.9	-3.5	17006.9
-85.0	0.0	-64.5	0.0	-44.0	0.0	-23.5	7.2	-3.0	18701.7
-84.5	0.0	-64.0	0.0	-43.5	0.0	-23.0	8.7	-2.5	20022.3
-84.0	0.0	-63.5	0.0	-43.0	0.0	-22.5	10.6	-2.0	21311.6
-83.5	0.0	-63.0	0.0	-42.5	0.0	-22.0	12.7	-1.5	22109.2
-83.0	0.0	-62.5	0.0	-42.0	0.0	-21.5	15.2	-1.0	22841.6
-82.5	0.0	-62.0	0.0	-41.5	0.0	-21.0	18.1	-0.5	23096.7
-82.0	0.0	-61.5	0.0	-41.0	0.0	-20.5	21.4	0.0	23270.4
-81.5	0.0	-61.0	0.0	-40.5	0.0	-20.0	25.3	0.5	23129.7
-81.0	0.0	-60.5	0.0	-40.0	0.0	-19.5	29.7	1.0	22907.2
-80.5	0.0	-60.0	0.0	-39.5	0.0	-19.0	34.7	1.5	22223.1
-80.0	0.0	-59.5	0.0	-39.0	0.0	-18.5	40.5	2.0	21472.2
-79.5	0.0	-59.0	0.0	-38.5	0.0	-18.0	47.1	2.5	20172.5
-79.0	0.0	-58.5	0.0	-38.0	0.0	-17.5	55.2	3.0	18841.2
-78.5	0.0	-58.0	0.0	-37.5	0.0	-17.0	64.2	3.5	17105.3
-78.0	0.0	-57.5	0.0	-37.0	0.0	-16.5	75.3	4.0	15384.2
-77.5	0.0	-57.0	0.0	-36.5	0.0	-16.0	87.8	4.5	13464.5
-77.0	0.0	-56.5	0.0	-36.0	0.0	-15.5	103.2	5.0	11604.5
-76.5	0.0	-56.0	0.0	-35.5	0.0	-15.0	120.6	5.5	9810.7
-76.0	0.0	-55.5	0.0	-35.0	0.0	-14.5	143.4	6.0	8104.6
-75.5	0.0	-55.0	0.0	-34.5	0.0	-14.0	169.1	6.5	6636.6
-75.0	0.0	-54.5	0.0	-34.0	0.1	-13.5	203.7	7.0	5262.9
-74.5	0.0	-54.0	0.0	-33.5	0.1	-13.0	242.9	7.5	4142.2
-74.0	0.0	-53.5	0.0	-33.0	0.1	-12.5	298.3	8.0	3110.4
-73.5	0.0	-53.0	0.0	-32.5	0.1	-12.0	360.8	8.5	2379.0
-73.0	0.0	-52.5	0.0	-32.0	0.2	-11.5	454.6	9.0	1715.1
-72.5	0.0	-52.0	0.0	-31.5	0.2	-11.0	560.1	9.5	1325.2
-72.0	0.0	-51.5	0.0	-31.0	0.3	-10.5	727.9	10.0	974.7
-71.5	0.0	-51.0	0.0	-30.5	0.3	-10.0	915.8	10.5	774.0
-71.0	0.0	-50.5	0.0	-30.0	0.4	-9.5	1242.1	11.0	594.8
-70.5	0.0	-50.0	0.0	-29.5	0.5	-9.0	1605.1	11.5	482.5
-70.0	0.0	-49.5	0.0	-29.0	0.7	-8.5	2250.5	12.0	382.7

Luminous Intensity Distribution									
Angle (°C)	CP (cd)	Angle (°C)	CP (cd)	Angle (°C)	CP (cd)	Angle (°C)	CP (cd)		
12.5	316.0	33.0	0.1	53.5	0.0	74.0	0.0		
13.0	256.9	33.5	0.1	54.0	0.0	74.5	0.0		
13.5	215.2	34.0	0.1	54.5	0.0	75.0	0.0		
14.0	178.4	34.5	0.0	55.0	0.0	75.5	0.0		
14.5	150.9	35.0	0.0	55.5	0.0	76.0	0.0		
15.0	126.7	35.5	0.0	56.0	0.0	76.5	0.0		
15.5	108.2	36.0	0.0	56.5	0.0	77.0	0.0		
16.0	91.8	36.5	0.0	57.0	0.0	77.5	0.0		
16.5	78.3	37.0	0.0	57.5	0.0	78.0	0.0		
17.0	66.5	37.5	0.0	58.0	0.0	78.5	0.0		
17.5	56.8	38.0	0.0	58.5	0.0	79.0	0.0		
18.0	48.2	38.5	0.0	59.0	0.0	79.5	0.0		
18.5	41.1	39.0	0.0	59.5	0.0	80.0	0.0		
19.0	34.8	39.5	0.0	60.0	0.0	80.5	0.0		
19.5	29.5	40.0	0.0	60.5	0.0	81.0	0.0		
20.0	24.8	40.5	0.0	61.0	0.0	81.5	0.0		
20.5	20.8	41.0	0.0	61.5	0.0	82.0	0.0		
21.0	17.4	41.5	0.0	62.0	0.0	82.5	0.0		
21.5	14.5	42.0	0.0	62.5	0.0	83.0	0.0		
22.0	12.0	42.5	0.0	63.0	0.0	83.5	0.0		
22.5	9.9	43.0	0.0	63.5	0.0	84.0	0.0		
23.0	8.2	43.5	0.0	64.0	0.0	84.5	0.0		
23.5	6.7	44.0	0.0	64.5	0.0	85.0	0.0		
24.0	5.5	44.5	0.0	65.0	0.0	85.5	0.0		
24.5	4.5	45.0	0.0	65.5	0.0	86.0	0.0		
25.0	3.7	45.5	0.0	66.0	0.0	86.5	0.0		
25.5	3.0	46.0	0.0	66.5	0.0	87.0	0.0		
26.0	2.4	46.5	0.0	67.0	0.0	87.5	0.0		
26.5	2.0	47.0	0.0	67.5	0.0	88.0	0.0		
27.0	1.6	47.5	0.0	68.0	0.0	88.5	0.0		
27.5	1.3	48.0	0.0	68.5	0.0	89.0	0.0		
28.0	1.0	48.5	0.0	69.0	0.0	89.5	0.0		
28.5	0.8	49.0	0.0	69.5	0.0	90.0	0.0		
29.0	0.6	49.5	0.0	70.0	0.0				
29.5	0.5	50.0	0.0	70.5	0.0				
30.0	0.4	50.5	0.0	71.0	0.0				
30.5	0.3	51.0	0.0	71.5	0.0				
31.0	0.2	51.5	0.0	72.0	0.0				
31.5	0.2	52.0	0.0	72.5	0.0				
32.0	0.2	52.5	0.0	73.0	0.0				
32.5	0.1	53.0	0.0	73.5	0.0				