



UL Verification Services Inc.
7036 Snowdrift Road
Allentown, PA 18106
610-774-1300

Integrating Sphere Test Report

Relevant Standards
IES LM-79-2008
ANSI C78.377-2011, ANSI C82.77-2002
CIE 13.3-1995, CIE 15-2004

Prepared For
Elemental LED Inc, DBA Diode LED
Wes Buck
Suite 211, 1195 Park Ave.
Emeryville, CA 94608
United States

Catalog Number
SPOTMOD™ 12V LED Fixture & Recessed Gimbal Fixture DI-SPOT-XX50-45-YY

Order Number
10461972
Test Number
748180

Test Date
2014-09-19

Prepared By

Javier Caban

Javier Caban, Technician

Approved By

Eric M. Gaudreau

Eric Gaudreau, Engineering Project Handler

The results contained in this report pertain only to the tested sample.
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Luminaire Description: Aluminum housing, plastic patterned enclosure
Catalog Number: SPOTMOD™ 12V LED Fixture & Recessed Gimbal Fixture DI-SPOT-XX50-45-YY
Lamp: Three white LEDs with optics below each
Mounting: Surface
Ballast/Driver: One Meanwell LPV-60-12

Luminaire



Summary of Results

Radiant Flux:	486.7 mW
Luminous Flux:	162.0 Lumens
Luminaire Efficacy:	50.6 Lumens/Watt
CCT:	4923 K
CRI (Ra):	66.8
Chromaticity (x):	0.3477
Chromaticity (y):	0.3582
Chromaticity (u):	0.2106
Chromaticity (v):	0.3255
Duv:	0.0022

Test Conditions

Test Temperature:	24.7 °C
Voltage:	120.0 VAC
Current:	0.06895 A
Power:	3.200 W
Power Factor:	0.386
Frequency:	60 Hz
Current THD:	185 %

Testing was performed in a 1-meter integrating sphere using the 4 π geometry method.

Absorption correction was employed for this measurement.

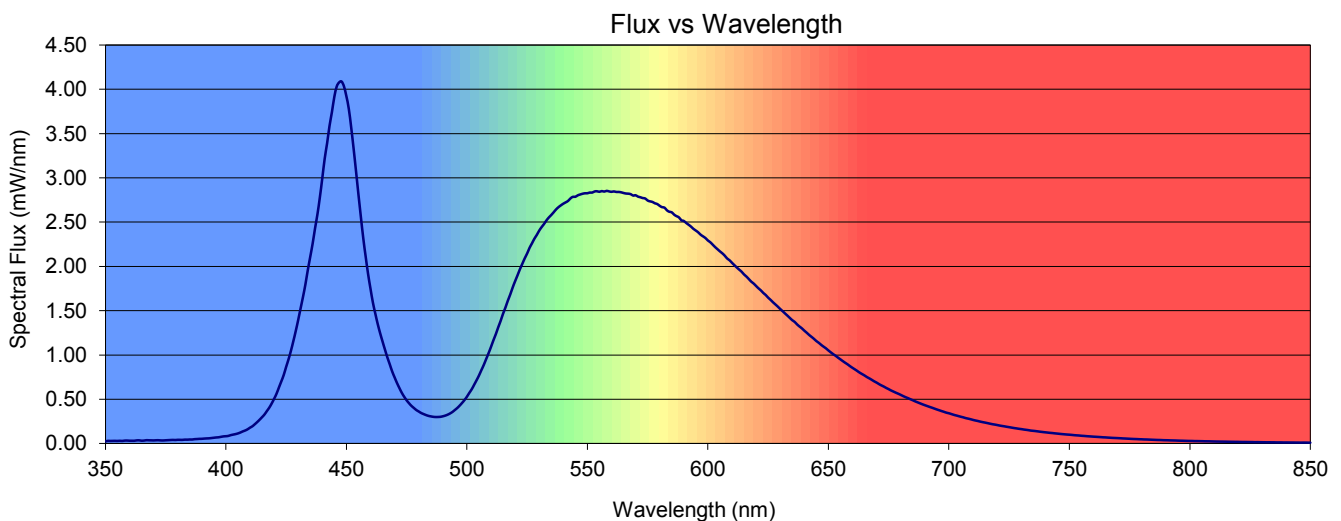
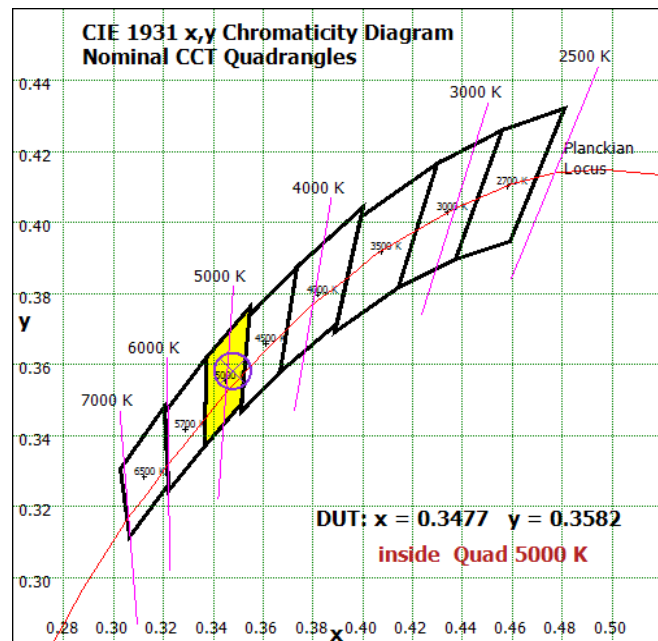
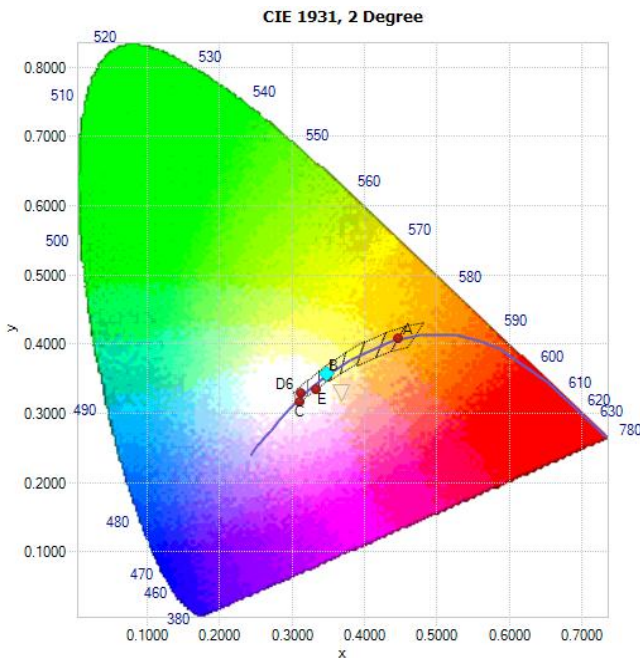


Chromaticity Coordinates

x	y	u	v	u'	v'	Duv
0.3477	0.3582	0.2106	0.3255	0.2106	0.4882	0.0022

Color Rendering Index Detail

Ra (CRI)	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
66.8	64.5	71.5	73.9	67.2	63.9	58.8	79.0	55.9	-34.4	29.7	60.1	28.5	64.7	84.8





Spectral Power Distribution

λ(nm)	mW/nm	λ(nm)	mW/nm	λ(nm)	mW/nm	λ(nm)	mW/nm	λ(nm)	mW/nm	λ(nm)	mW/nm	λ(nm)	mW/nm	λ(nm)	mW/nm
350	0.0236	422	0.632	494	0.356	566	2.82	638	1.32	710	0.267	782	0.0454		
351	0.0297	423	0.702	495	0.378	567	2.82	639	1.30	711	0.260	783	0.0444		
352	0.0288	424	0.774	496	0.401	568	2.82	640	1.28	712	0.254	784	0.0429		
353	0.0296	425	0.865	497	0.428	569	2.80	641	1.25	713	0.248	785	0.0418		
354	0.0300	426	0.952	498	0.458	570	2.80	642	1.23	714	0.242	786	0.0406		
355	0.0291	427	1.05	499	0.491	571	2.79	643	1.20	715	0.236	787	0.0398		
356	0.0306	428	1.16	500	0.528	572	2.78	644	1.18	716	0.231	788	0.0391		
357	0.0291	429	1.27	501	0.571	573	2.77	645	1.16	717	0.224	789	0.0376		
358	0.0329	430	1.39	502	0.612	574	2.77	646	1.14	718	0.219	790	0.0372		
359	0.0333	431	1.53	503	0.662	575	2.74	647	1.11	719	0.214	791	0.0364		
360	0.0317	432	1.66	504	0.714	576	2.73	648	1.09	720	0.209	792	0.0354		
361	0.0312	433	1.80	505	0.767	577	2.73	649	1.07	721	0.203	793	0.0346		
362	0.0314	434	1.96	506	0.828	578	2.71	650	1.05	722	0.199	794	0.0340		
363	0.0351	435	2.11	507	0.887	579	2.70	651	1.03	723	0.194	795	0.0329		
364	0.0358	436	2.26	508	0.954	580	2.68	652	1.01	724	0.189	796	0.0319		
365	0.0320	437	2.43	509	1.02	581	2.67	653	0.991	725	0.185	797	0.0313		
366	0.0332	438	2.59	510	1.09	582	2.66	654	0.970	726	0.180	798	0.0305		
367	0.0373	439	2.78	511	1.16	583	2.63	655	0.950	727	0.175	799	0.0296		
368	0.0364	440	3.00	512	1.23	584	2.62	656	0.930	728	0.171	800	0.0288		
369	0.0357	441	3.22	513	1.31	585	2.61	657	0.912	729	0.166	801	0.0286		
370	0.0351	442	3.39	514	1.38	586	2.58	658	0.893	730	0.163	802	0.0274		
371	0.0366	443	3.59	515	1.47	587	2.57	659	0.873	731	0.158	803	0.0274		
372	0.0371	444	3.74	516	1.54	588	2.55	660	0.855	732	0.155	804	0.0267		
373	0.0349	445	3.92	517	1.61	589	2.52	661	0.837	733	0.151	805	0.0261		
374	0.0346	446	4.03	518	1.68	590	2.51	662	0.819	734	0.146	806	0.0253		
375	0.0364	447	4.08	519	1.76	591	2.49	663	0.800	735	0.143	807	0.0249		
376	0.0379	448	4.09	520	1.83	592	2.47	664	0.784	736	0.140	808	0.0246		
377	0.0394	449	4.03	521	1.90	593	2.45	665	0.768	737	0.137	809	0.0237		
378	0.0407	450	3.92	522	1.97	594	2.42	666	0.750	738	0.133	810	0.0230		
379	0.0395	451	3.78	523	2.03	595	2.41	667	0.736	739	0.130	811	0.0224		
380	0.0417	452	3.57	524	2.09	596	2.38	668	0.719	740	0.126	812	0.0219		
381	0.0414	453	3.33	525	2.15	597	2.36	669	0.702	741	0.124	813	0.0214		
382	0.0412	454	3.07	526	2.21	598	2.34	670	0.688	742	0.120	814	0.0212		
383	0.0439	455	2.81	527	2.26	599	2.32	671	0.671	743	0.118	815	0.0207		
384	0.0435	456	2.56	528	2.31	600	2.29	672	0.656	744	0.115	816	0.0202		
385	0.0455	457	2.32	529	2.36	601	2.27	673	0.643	745	0.112	817	0.0195		
386	0.0453	458	2.11	530	2.40	602	2.25	674	0.628	746	0.109	818	0.0192		
387	0.0490	459	1.92	531	2.44	603	2.22	675	0.614	747	0.106	819	0.0188		
388	0.0507	460	1.75	532	2.48	604	2.19	676	0.599	748	0.104	820	0.0186		
389	0.0526	461	1.59	533	2.52	605	2.17	677	0.587	749	0.102	821	0.0176		
390	0.0533	462	1.47	534	2.55	606	2.15	678	0.574	750	0.0995	822	0.0173		
391	0.0557	463	1.35	535	2.58	607	2.12	679	0.562	751	0.0973	823	0.0173		
392	0.0574	464	1.25	536	2.61	608	2.09	680	0.550	752	0.0944	824	0.0169		
393	0.0589	465	1.15	537	2.64	609	2.07	681	0.536	753	0.0921	825	0.0165		
394	0.0618	466	1.06	538	2.67	610	2.04	682	0.524	754	0.0904	826	0.0162		
395	0.0651	467	0.972	539	2.69	611	2.01	683	0.513	755	0.0875	827	0.0151		
396	0.0685	468	0.895	540	2.71	612	1.99	684	0.501	756	0.0858	828	0.0156		
397	0.0705	469	0.814	541	2.72	613	1.96	685	0.489	757	0.0833	829	0.0149		
398	0.0756	470	0.748	542	2.74	614	1.94	686	0.476	758	0.0812	830	0.0144		
399	0.0804	471	0.684	543	2.77	615	1.91	687	0.465	759	0.0795	831	0.0140		
400	0.0825	472	0.626	544	2.79	616	1.89	688	0.454	760	0.0775	832	0.0136		
401	0.0858	473	0.572	545	2.79	617	1.86	689	0.443	761	0.0758	833	0.0139		
402	0.0945	474	0.528	546	2.80	618	1.83	690	0.433	762	0.0740	834	0.0132		
403	0.100	475	0.488	547	2.81	619	1.81	691	0.424	763	0.0723	835	0.0132		
404	0.106	476	0.455	548	2.82	620	1.78	692	0.414	764	0.0702	836	0.0122		
405	0.114	477	0.425	549	2.83	621	1.75	693	0.404	765	0.0690	837	0.0124		
406	0.124	478	0.401	550	2.83	622	1.73	694	0.394	766	0.0670	838	0.0124		
407	0.137	479	0.379	551	2.83	623	1.70	695	0.385	767	0.0652	839	0.0116		
408	0.147	480	0.362	552	2.83	624	1.68	696	0.375	768	0.0634	840	0.0119		
409	0.160	481	0.345	553	2.85	625	1.65	697	0.366	769	0.0624	841	0.0114		
410	0.179	482	0.333	554	2.85	626	1.62	698	0.358	770	0.0610	842	0.0111		
411	0.195	483	0.322	555	2.84	627	1.60	699	0.348	771	0.0597	843	0.0110		
412	0.218	484	0.313	556	2.85	628	1.57	700	0.342	772	0.0577	844	0.0107		
413	0.242	485	0.307	557	2.84	629	1.55	701	0.333	773	0.0565	845	0.0105		
414	0.269	486	0.302	558	2.85	630	1.52	702	0.324	774	0.0551	846	0.00997		
415	0.297	487	0.299	559	2.85	631	1.49	703	0.317	775	0.0536	847	0.0104		
416	0.327	488	0.300	560	2.84	632	1.47	704	0.310	776	0.0521	848	0.0102		
417	0.366	489	0.302	561	2.85	633	1.44	705	0.302	777	0.0509	849	0.00964		
418	0.405	490	0.307	562	2.84	634	1.42	706	0.295	778	0.0500	850	0.00932		
419	0.452	491	0.315	563	2.84	635	1.39	707	0.287	779	0.0483				
420	0.504	492	0.326	564	2.84	636	1.37	708	0.281	780	0.0474				
421	0.562	493	0.339	565	2.83	637	1.35	709	0.274	781	0.0461				



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Photometric Indoor Test Report

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ANSI C82.77-2002

Prepared For
Elemental LED Inc, DBA Diode LED
Wes Buck
Suite 211, 1195 Park Ave.
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United States

Catalog Number
SPOTMOD™ 12V LED Fixture & Recessed Gimbal Fixture DI-SPOT-XX50-45-YY
Project Number
10461972
Test Number
748179

Test Date

2014-09-18

Prepared By

Handwritten signature of Javier Caban in black ink.

Javier Caban, Technician

Approved By

Handwritten signature of Eric M. Gaudreau in black ink.

Eric Gaudreau, Engineering Project Handler

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Luminaire Description: Aluminum housing, plastic patterned enclosure
Catalog Number: SPOTMOD™ 12V LED Fixture & Recessed Gimbal Fixture DI-SPOT-XX50-45-YY
Lamp: Three white LEDs with optics below each
Mounting: Surface
Ballast/Driver: One Meanwell LPV-60-12

Luminaire

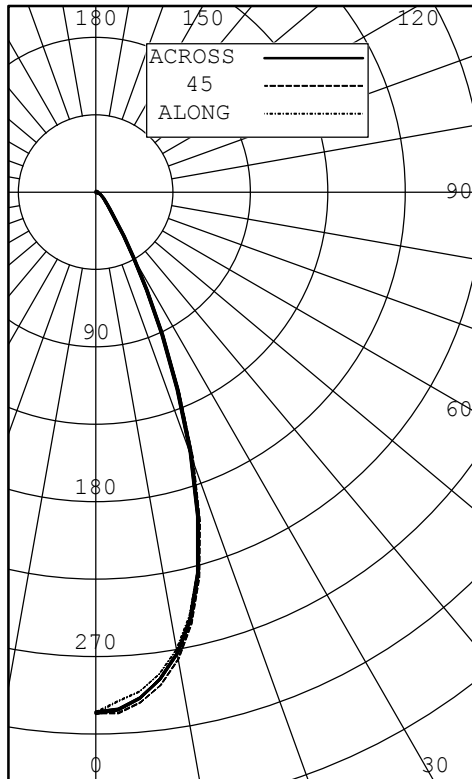


Test Conditions

Test Temperature:	24.8 °C
Voltage:	120.0 VAC
Current:	0.06480 A
Power:	3.182 W
Power Factor:	0.409
Frequency:	60 Hz
Current THD:	172 %



INTENSITY (CANDLEPOWER) SUMMARY OUTPUT LUMENS



ANGLE	ALONG	22.5	45	67.5	ACROSS	OUTPUT LUMENS
0	303	303	303	303	303	
5	291	296	298	297	295	28
10	270	274	276	274	272	
15	229	230	232	231	229	62
20	162	162	164	164	161	
25	91	91	93	92	91	43
30	43	44	44	44	44	
35	22	21	22	22	21	15
40	13	12	13	13	12	
45	10	8	9	9	8	7
50	7	6	6	6	6	
55	5	5	5	5	5	4
60	4	4	4	4	4	
65	3	3	3	3	3	3
70	2	2	2	2	2	
75	2	1	2	2	1	2
80	1	1	1	1	1	
85	0	0	0	0	0	0
90	0	0	0	0	0	

ZONAL LUMENS AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	132	81.04
0-40	147	90.03
0-60	158	96.95
0-90	163	100.00
40-90	16	9.97
60-90	5	3.05
90-180	0	0.00
0-180	163	100.00

EFFICACY (LUMENS PER WATT): 51.1

*** THIS IS AN ABSOLUTE TEST ***

LUMINOUS DIAMETER: 0.875 INS

LUMINANCE SUMMARY CD./SQ.M.

S/MH: 0.7
 SC: 0.7

ANGLE	ALONG	45	ACROSS
45	34995	32018	30737
55	22245	21879	21428
65	18297	18362	17755
75	14939	14956	14496
85	11830	13343	11875

TESTED IN ACCORDANCE WITH IES PROCEDURES.



INTENSITY (CANDLEPOWER) DATA
 IN 2.5 DEGREE STEPS

ANGLE	PLANE						OUTPUT LUMENS
	ALONG	22.5	45	67.5	ACROSS	AVERAGE	
0.0	303	303	303	303	303	303	
2.5	296	301	303	302	301	301	
5.0	291	296	298	297	295	296	28
7.5	283	288	289	287	286	287	
10.0	270	274	276	274	272	274	
12.5	253	256	257	255	254	255	
15.0	229	230	232	231	229	230	62
17.5	198	198	201	200	198	199	
20.0	162	162	164	164	161	163	
22.5	125	125	127	126	124	125	
25.0	91	91	93	92	91	92	43
27.5	63	64	65	64	64	64	
30.0	43	44	44	44	44	44	
32.5	30	30	31	30	30	30	
35.0	22	21	22	22	21	22	15
37.5	17	16	16	16	16	16	
40.0	13	12	13	13	12	13	
42.5	11	10	10	10	10	10	
45.0	10	8	9	9	8	9	7
47.5	8	7	7	7	7	7	
50.0	7	6	6	6	6	6	
52.5	6	5	6	6	5	6	
55.0	5	5	5	5	5	5	4
57.5	4	4	4	4	4	4	
60.0	4	4	4	4	4	4	
62.5	3	3	3	3	3	3	
65.0	3	3	3	3	3	3	3
67.5	3	3	3	3	3	3	
70.0	2	2	2	2	2	2	
72.5	2	2	2	2	2	2	
75.0	2	1	2	2	1	1	2
77.5	1	1	1	1	1	1	
80.0	1	1	1	1	1	1	
82.5	1	1	1	1	1	1	
85.0	0	0	0	0	0	0	0
87.5	0	0	0	0	0	0	
90.0	0	0	0	0	0	0	



COEFFICIENTS OF UTILIZATION

ZONAL CAVITY METHOD

EFFECTIVE FLOOR CAVITY REFLECTANCE = .20

CC WALL	90				80				70				50				30				10				0	
	70	50	30	10	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	50	30	10	0	
RCR																										
0	1.221	.221	.221	.22	1.191	.191	.191	.19	1.161	.161	.161	.16	1.111	.111	.111	.11	1.061	.061	.06	1.021	.021	.02	1.00			
1	1.171	.141	.121	.10	1.151	.121	.101	.08	1.121	.101	.081	.07	1.061	.051	.03	1.021	.011	.00	0.990	.980	.97	0.96				
2	1.121	.081	.051	.01	1.101	.061	.031	.00	1.081	.051	.020	.99	1.010	.990	.97	0.990	.970	.95	0.960	.950	.93	0.92				
3	1.081	.020	.980	.95	1.061	.010	.970	.94	1.051	.000	.970	.94	0.980	.950	.92	0.950	.930	.91	0.930	.910	.89	0.88				
4	1.040	.980	.930	.90	1.030	.970	.930	.90	1.010	.960	.920	.89	0.940	.910	.88	0.920	.890	.87	0.900	.880	.86	0.85				
5	1.010	.940	.890	.85	0.990	.930	.880	.85	0.980	.920	.870	.84	0.900	.870	.84	0.890	.850	.83	0.870	.850	.82	0.81				
6	0.970	.900	.850	.82	0.960	.890	.850	.82	0.950	.880	.840	.81	0.870	.840	.81	0.860	.830	.80	0.850	.820	.80	0.78				
7	0.930	.860	.810	.78	0.930	.860	.810	.78	0.920	.850	.810	.77	0.840	.800	.77	0.830	.790	.77	0.820	.790	.76	0.75				
8	0.910	.830	.780	.75	0.900	.820	.780	.75	0.890	.820	.780	.74	0.810	.770	.74	0.800	.760	.74	0.790	.760	.74	0.73				
9	0.870	.800	.750	.72	0.870	.790	.750	.72	0.860	.790	.750	.72	0.780	.740	.71	0.770	.740	.71	0.760	.730	.71	0.70				
10	0.850	.770	.720	.69	0.840	.770	.720	.69	0.830	.760	.720	.69	0.750	.720	.69	0.750	.710	.69	0.740	.710	.68	0.67				

THE ABOVE COEFFICIENTS HAVE BEEN CALCULATED BASED ON LUMINAIRE LUMENS
 BECAUSE IN AN ABSOLUTE TEST THE BARE LAMP LUMENS ARE UNKNOWN.
 LIGHTING DESIGN CALCULATIONS MADE USING THESE COEFFICIENTS SHOULD
 THEREFORE USE THE LUMINAIRE LUMENS IN THE CALCULATION FORMULA

LABORATORY RESULTS MAY NOT BE REPRESENTATIVE OF FIELD PERFORMANCE.
 BALLAST AND FIELD FACTORS HAVE NOT BEEN APPLIED.

TEST DISTANCE EXCEEDS FIVE TIMES THE GREATEST
 LUMINOUS OPENING OF LUMINAIRE.



Cone of Light

Cone Of Light Tabulation

Mounting Height (Feet)	Footcandles at Nadir	Diameter (Feet)
4.00	18.8	2.74
6.00	8.36	4.11
8.00	4.70	5.49
10.0	3.01	6.86
12.0	2.09	8.23
14.0	1.54	9.60
16.0	1.18	11.0

Cone of Light Plot

