



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-XX50-15-YY

Order Number
10461972
Test Number
748184

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-XX50-15-YY
Lamp: Three white LEDs with optics below each
Mounting: Surface
Ballast/Driver: One Meanwell LPV-60-12

Luminaire



Summary of Results

Radiant Flux:	508.9 mW
Luminous Flux:	169.3 Lumens
Luminaire Efficacy:	52.9 Lumens/Watt
CCT:	4924 K
CRI (Ra):	66.7
Chromaticity (x):	0.3476
Chromaticity (y):	0.3578
Chromaticity (u):	0.2108
Chromaticity (v):	0.3253
Duv:	0.0020

Test Conditions

Test Temperature:	24.5 °C
Voltage:	120.0 VAC
Current:	0.06902 A
Power:	3.200 W
Power Factor:	0.387
Frequency:	60 Hz
Current THD:	184 %

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

Absorption correction was employed for this measurement.

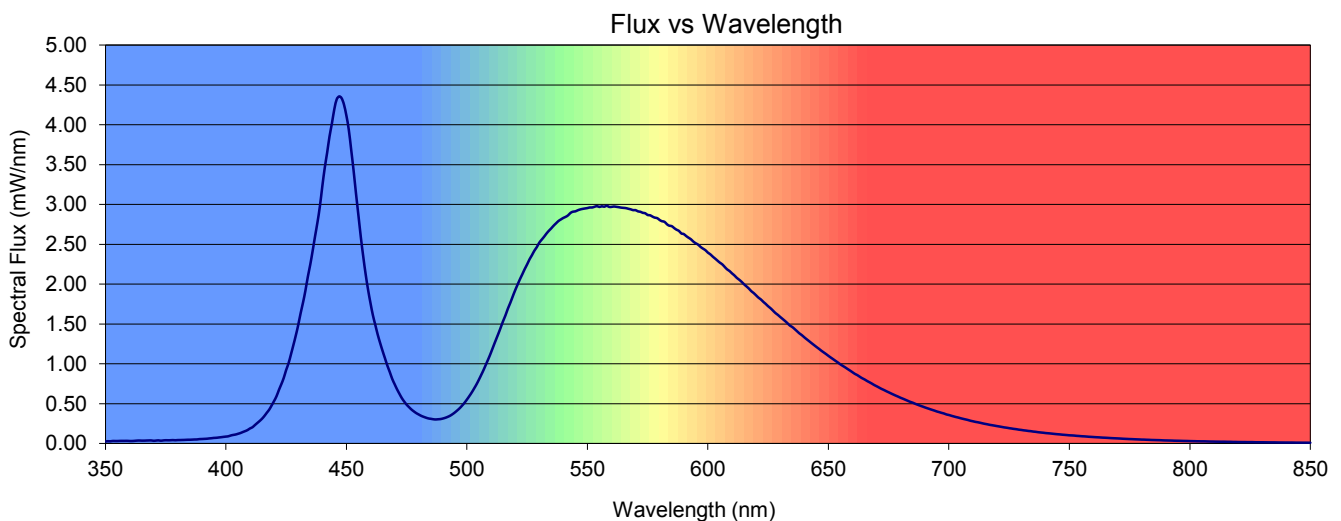
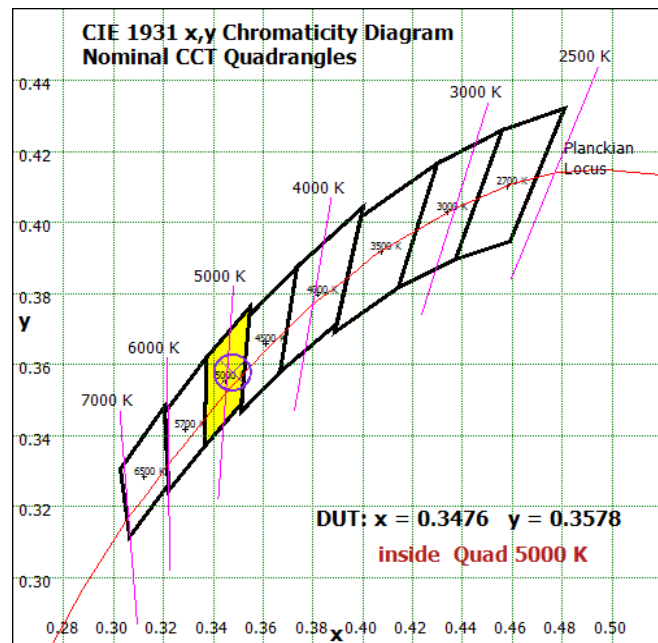
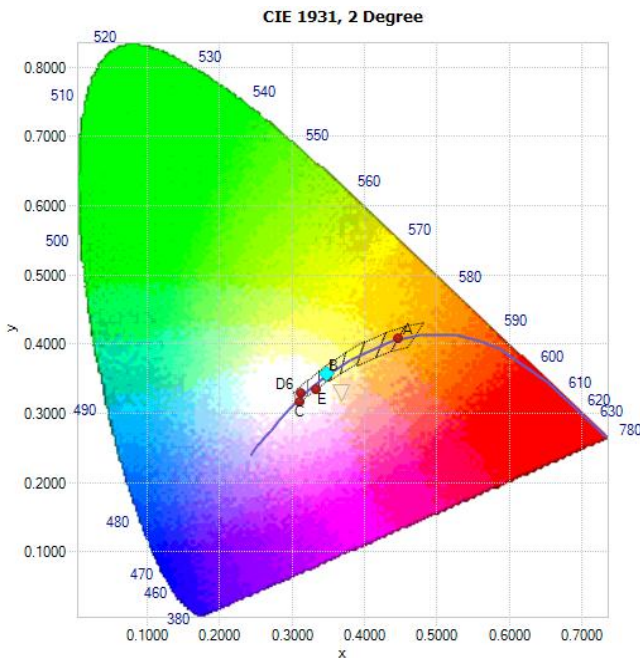


Chromaticity Coordinates

x	y	u	v	u'	v'	Duv
0.3476	0.3578	0.2108	0.3253	0.2108	0.4880	0.0020

Color Rendering Index Detail

Ra (CRI)	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
66.7	64.5	71.3	73.6	67.2	63.9	58.6	78.7	56.0	-34.3	29.2	60.3	28.5	64.7	84.6





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
350	0.0251	422	0.671	494	0.367	566	2.95	638	1.38	710	0.279	782	0.0472
351	0.0286	423	0.744	495	0.390	567	2.95	639	1.36	711	0.272	783	0.0463
352	0.0277	424	0.822	496	0.415	568	2.94	640	1.33	712	0.267	784	0.0444
353	0.0316	425	0.922	497	0.443	569	2.93	641	1.31	713	0.260	785	0.0438
354	0.0316	426	1.01	498	0.475	570	2.93	642	1.28	714	0.253	786	0.0428
355	0.0313	427	1.12	499	0.511	571	2.91	643	1.26	715	0.247	787	0.0421
356	0.0328	428	1.23	500	0.551	572	2.91	644	1.24	716	0.241	788	0.0410
357	0.0332	429	1.35	501	0.594	573	2.89	645	1.21	717	0.234	789	0.0393
358	0.0331	430	1.48	502	0.640	574	2.89	646	1.19	718	0.229	790	0.0386
359	0.0335	431	1.63	503	0.690	575	2.87	647	1.17	719	0.224	791	0.0378
360	0.0319	432	1.77	504	0.743	576	2.86	648	1.14	720	0.218	792	0.0371
361	0.0315	433	1.92	505	0.802	577	2.85	649	1.12	721	0.213	793	0.0360
362	0.0333	434	2.09	506	0.864	578	2.83	650	1.10	722	0.208	794	0.0350
363	0.0362	435	2.24	507	0.929	579	2.83	651	1.08	723	0.202	795	0.0344
364	0.0376	436	2.42	508	0.998	580	2.80	652	1.06	724	0.198	796	0.0338
365	0.0362	437	2.60	509	1.07	581	2.79	653	1.04	725	0.193	797	0.0328
366	0.0361	438	2.78	510	1.14	582	2.78	654	1.02	726	0.188	798	0.0321
367	0.0373	439	2.97	511	1.22	583	2.75	655	0.993	727	0.183	799	0.0315
368	0.0384	440	3.22	512	1.30	584	2.73	656	0.974	728	0.180	800	0.0305
369	0.0389	441	3.45	513	1.37	585	2.73	657	0.955	729	0.174	801	0.0296
370	0.0345	442	3.65	514	1.45	586	2.70	658	0.934	730	0.171	802	0.0290
371	0.0367	443	3.85	515	1.53	587	2.68	659	0.915	731	0.166	803	0.0282
372	0.0395	444	4.02	516	1.61	588	2.67	660	0.894	732	0.162	804	0.0276
373	0.0354	445	4.20	517	1.69	589	2.64	661	0.874	733	0.158	805	0.0271
374	0.0387	446	4.32	518	1.76	590	2.63	662	0.858	734	0.155	806	0.0273
375	0.0412	447	4.35	519	1.84	591	2.60	663	0.838	735	0.150	807	0.0262
376	0.0404	448	4.33	520	1.92	592	2.58	664	0.820	736	0.147	808	0.0251
377	0.0410	449	4.25	521	1.99	593	2.56	665	0.804	737	0.142	809	0.0244
378	0.0430	450	4.11	522	2.06	594	2.53	666	0.786	738	0.139	810	0.0241
379	0.0409	451	3.94	523	2.12	595	2.51	667	0.769	739	0.136	811	0.0233
380	0.0432	452	3.68	524	2.19	596	2.49	668	0.753	740	0.132	812	0.0231
381	0.0436	453	3.42	525	2.25	597	2.47	669	0.734	741	0.129	813	0.0223
382	0.0444	454	3.13	526	2.31	598	2.44	670	0.719	742	0.127	814	0.0227
383	0.0454	455	2.86	527	2.36	599	2.43	671	0.703	743	0.123	815	0.0219
384	0.0471	456	2.59	528	2.42	600	2.40	672	0.686	744	0.120	816	0.0214
385	0.0476	457	2.35	529	2.46	601	2.37	673	0.673	745	0.117	817	0.0211
386	0.0487	458	2.12	530	2.52	602	2.35	674	0.657	746	0.114	818	0.0198
387	0.0505	459	1.93	531	2.56	603	2.32	675	0.643	747	0.111	819	0.0197
388	0.0513	460	1.76	532	2.59	604	2.29	676	0.629	748	0.109	820	0.0188
389	0.0552	461	1.61	533	2.63	605	2.27	677	0.614	749	0.106	821	0.0184
390	0.0565	462	1.49	534	2.67	606	2.25	678	0.601	750	0.103	822	0.0181
391	0.0583	463	1.37	535	2.70	607	2.22	679	0.588	751	0.102	823	0.0180
392	0.0598	464	1.26	536	2.73	608	2.19	680	0.573	752	0.0997	824	0.0174
393	0.0634	465	1.16	537	2.76	609	2.16	681	0.562	753	0.0964	825	0.0175
394	0.0663	466	1.07	538	2.79	610	2.14	682	0.548	754	0.0943	826	0.0174
395	0.0701	467	0.977	539	2.81	611	2.11	683	0.535	755	0.0916	827	0.0161
396	0.0718	468	0.898	540	2.83	612	2.08	684	0.523	756	0.0898	828	0.0157
397	0.0755	469	0.812	541	2.84	613	2.06	685	0.512	757	0.0877	829	0.0156
398	0.0791	470	0.746	542	2.86	614	2.03	686	0.499	758	0.0851	830	0.0153
399	0.0832	471	0.682	543	2.89	615	2.00	687	0.487	759	0.0834	831	0.0152
400	0.0868	472	0.624	544	2.91	616	1.97	688	0.476	760	0.0813	832	0.0147
401	0.0906	473	0.570	545	2.91	617	1.94	689	0.465	761	0.0791	833	0.0144
402	0.101	474	0.526	546	2.93	618	1.91	690	0.454	762	0.0778	834	0.0141
403	0.107	475	0.487	547	2.94	619	1.89	691	0.443	763	0.0756	835	0.0140
404	0.113	476	0.456	548	2.94	620	1.86	692	0.433	764	0.0737	836	0.0135
405	0.122	477	0.427	549	2.95	621	1.83	693	0.423	765	0.0723	837	0.0127
406	0.131	478	0.403	550	2.95	622	1.81	694	0.413	766	0.0705	838	0.0126
407	0.144	479	0.381	551	2.96	623	1.78	695	0.402	767	0.0686	839	0.0123
408	0.156	480	0.364	552	2.96	624	1.75	696	0.394	768	0.0668	840	0.0121
409	0.169	481	0.348	553	2.97	625	1.72	697	0.384	769	0.0655	841	0.0119
410	0.189	482	0.336	554	2.98	626	1.70	698	0.376	770	0.0642	842	0.0120
411	0.204	483	0.325	555	2.97	627	1.67	699	0.365	771	0.0624	843	0.0118
412	0.230	484	0.315	556	2.98	628	1.64	700	0.358	772	0.0605	844	0.0108
413	0.257	485	0.310	557	2.97	629	1.62	701	0.349	773	0.0588	845	0.0107
414	0.282	486	0.305	558	2.98	630	1.59	702	0.340	774	0.0574	846	0.0106
415	0.311	487	0.302	559	2.97	631	1.56	703	0.332	775	0.0560	847	0.0102
416	0.346	488	0.304	560	2.97	632	1.54	704	0.325	776	0.0550	848	0.0102
417	0.387	489	0.307	561	2.97	633	1.51	705	0.316	777	0.0534	849	0.00990
418	0.426	490	0.313	562	2.97	634	1.48	706	0.309	778	0.0521	850	0.00969
419	0.479	491	0.322	563	2.97	635	1.46	707	0.302	779	0.0509		
420	0.533	492	0.334	564	2.96	636	1.44	708	0.295	780	0.0493		
421	0.593	493	0.348	565	2.96	637	1.41	709	0.285	781	0.0487		



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Photometric Indoor Test Report

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Prepared For
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748183

Test Date

2014-09-19

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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Lamp: Three white LEDs with optics below each
Mounting: Surface
Ballast/Driver: One Meanwell LPV-60-12

Luminaire

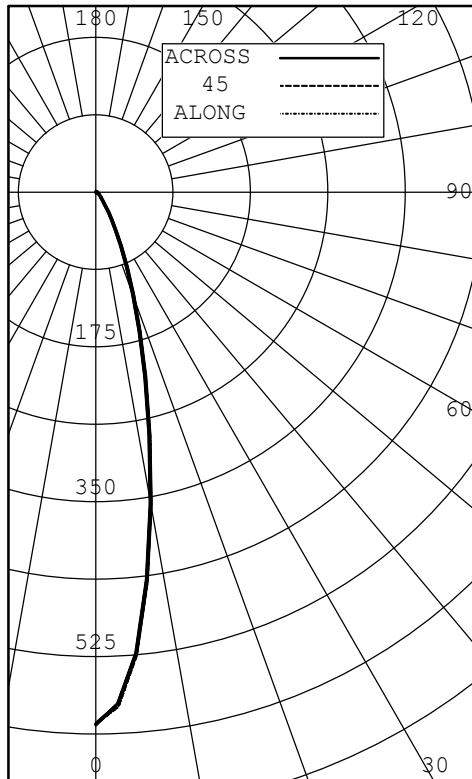


Test Conditions

Test Temperature:	25.1 °C
Voltage:	120.0 VAC
Current:	0.06509 A
Power:	3.200 W
Power Factor:	0.410
Frequency:	60 Hz
Current THD:	172 %



INTENSITY (CANDLEPOWER) SUMMARY OUTPUT LUMENS



ANGLE	ALONG	22.5	45	67.5	ACROSS	OUTPUT LUMENS
0	601	601	601	601	601	
5	525	528	527	524	523	45
10	360	360	359	358	358	
15	218	218	218	217	216	60
20	126	125	126	125	123	
25	70	69	69	68	67	32
30	37	36	37	36	36	
35	20	20	20	20	20	13
40	12	12	12	12	12	
45	8	8	8	8	8	7
50	6	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	2	2	2	2	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	137	82.46
0-40	151	90.33
0-60	162	96.92
0-90	167	100.00
40-90	16	9.67
60-90	5	3.08
90-180	0	0.00
0-180	167	100.00

EFFICACY (LUMENS PER WATT): 52.1

*** THIS IS AN ABSOLUTE TEST ***

LUMINOUS DIAMETER: 0.875 INS

LUMINANCE SUMMARY CD./SQ.M.

S/MH: 0.4
 SC: 0.4

ANGLE	ALONG	45	ACROSS
45	30803	30554	30006
55	21346	21879	22555
65	18297	18362	18979
75	15934	15455	14996
85	13309	11860	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	601	601	601	601	601	601	
2.5	583	585	583	581	579	582	
5.0	525	528	527	524	523	526	45
7.5	445	445	445	443	442	444	
10.0	360	360	359	358	358	359	
12.5	282	283	282	281	280	282	
15.0	218	218	218	217	216	218	60
17.5	167	166	167	166	165	166	
20.0	126	125	126	125	123	125	
22.5	95	93	93	93	91	93	
25.0	70	69	69	68	67	69	32
27.5	51	50	50	50	49	50	
30.0	37	36	37	36	36	36	
32.5	27	27	27	27	27	27	
35.0	20	20	20	20	20	20	13
37.5	15	15	15	15	15	15	
40.0	12	12	12	12	12	12	
42.5	10	10	10	10	10	10	
45.0	8	8	8	8	8	8	7
47.5	7	7	7	7	7	7	
50.0	6	6	6	6	6	6	
52.5	5	6	6	5	6	6	
55.0	5	5	5	5	5	5	4
57.5	4	5	4	4	5	4	
60.0	4	4	4	4	4	4	
62.5	3	4	3	3	4	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	2	2	2	2	2	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	.06	1.061	.051	.03	1.021	.011	.00	0.990	.980	.97	0.96			
2	1.121	.081	.051	.02	1.101	.071	.031	.00	1.081	.051	.020	.99	1.020	.990	.97	0.990	.970	.95	0.960	.950	.93	0.92			
3	1.081	.030	.990	.95	1.071	.020	.980	.95	1.051	.000	.970	.94	0.980	.950	.93	0.960	.930	.91	0.940	.920	.90	0.89			
4	1.050	.990	.940	.91	1.030	.980	.940	.90	1.020	.970	.930	.90	0.950	.910	.89	0.930	.900	.88	0.910	.890	.87	0.86			
5	1.020	.950	.900	.87	1.000	.940	.890	.86	0.980	.930	.890	.86	0.910	.880	.85	0.900	.870	.84	0.880	.860	.84	0.83			
6	0.990	.920	.870	.84	0.970	.910	.860	.83	0.960	.900	.860	.83	0.890	.850	.82	0.870	.840	.82	0.860	.830	.81	0.80			
7	0.950	.880	.830	.81	0.940	.870	.830	.80	0.930	.870	.830	.80	0.860	.820	.79	0.840	.810	.79	0.840	.810	.79	0.77			
8	0.930	.850	.810	.78	0.920	.850	.800	.77	0.900	.840	.800	.77	0.830	.790	.77	0.820	.790	.76	0.810	.780	.76	0.75			
9	0.900	.830	.780	.75	0.890	.820	.780	.75	0.880	.810	.780	.75	0.810	.770	.74	0.800	.760	.74	0.790	.760	.74	0.73			
10	0.870	.800	.750	.72	0.860	.790	.750	.72	0.860	.790	.750	.72	0.780	.750	.72	0.780	.740	.72	0.770	.740	.72	0.71			

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	37.7	1.60
6.00	16.7	2.40
8.00	9.42	3.20
10.0	6.03	4.00
12.0	4.19	4.79
14.0	3.08	5.59
16.0	2.36	6.39

Cone of Light Plot

