



7036 Snowdrift Road Suite 200
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
Lighting Science Group Corporation
Ivars Lauzums
1227 South Patrick Dr.
Satellite Beach, FL 32937-3970

Catalog Number
xxx B11 40WE W27 120 G1 BX

Order Number
10151501
Test Number
432166

Test Date
2013-12-18

Prepared By

A handwritten signature in black ink, appearing to read "Jeff A. Smith Jr.".

Jeff Smith Jr., Project Handler

Approved By

A handwritten signature in black ink, appearing to read "Jeffrey M. Lockner".

Jeffrey Lockner, Engineer

The results contained in this report pertain only to the tested sample.
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Lamp Description: Formed white plastic housing, clear plastic enclosure
Catalog Number: xxx B11 40WE W27 120 G1 BX
Lamp: One white LED array with clear and frosted plastic optic
Mounting: VBU

Lamp



Summary of Results

Radiant Flux:	1154 mW
Luminous Flux:	359.3 Lumens
Lamp Efficacy:	85.0 Lumens/Watt
CCT:	2742 K
CRI (Ra):	81.9
Chromaticity (x):	0.4557
Chromaticity (y):	0.4087
Chromaticity (u):	0.2607
Chromaticity (v):	0.3507
Duv:	0.0005

Test Conditions

Test Temperature:	24.4 °C
Voltage:	120.0 VAC
Current:	0.03927 A
Power:	4.227 W
Power Factor:	0.897
Frequency:	60 Hz
Current THD:	43.7 %

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

Absorption correction was employed for this measurement.

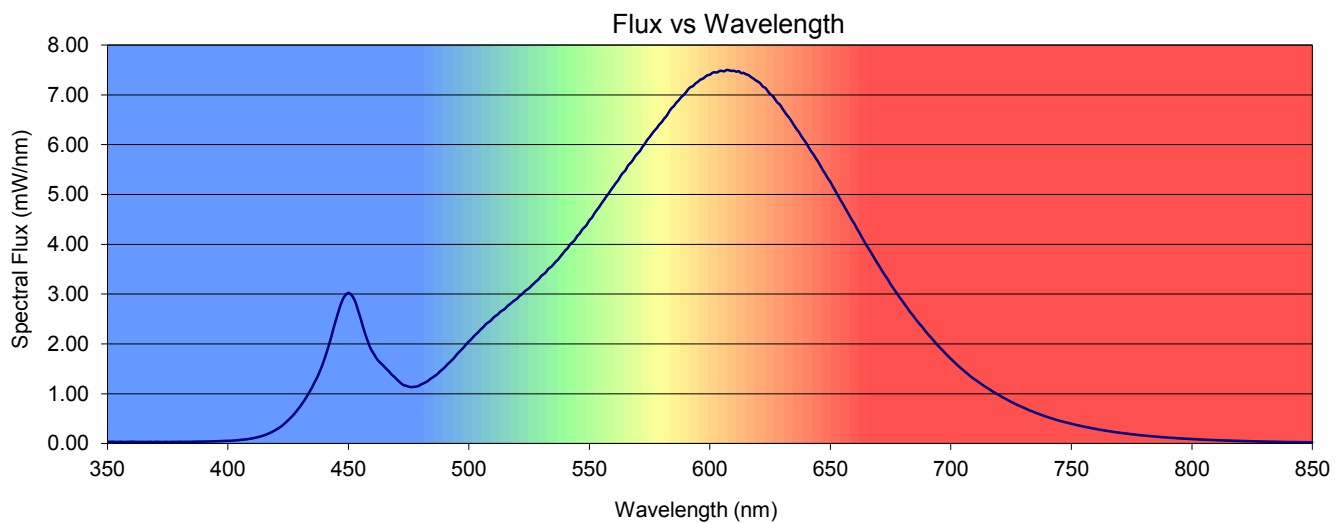
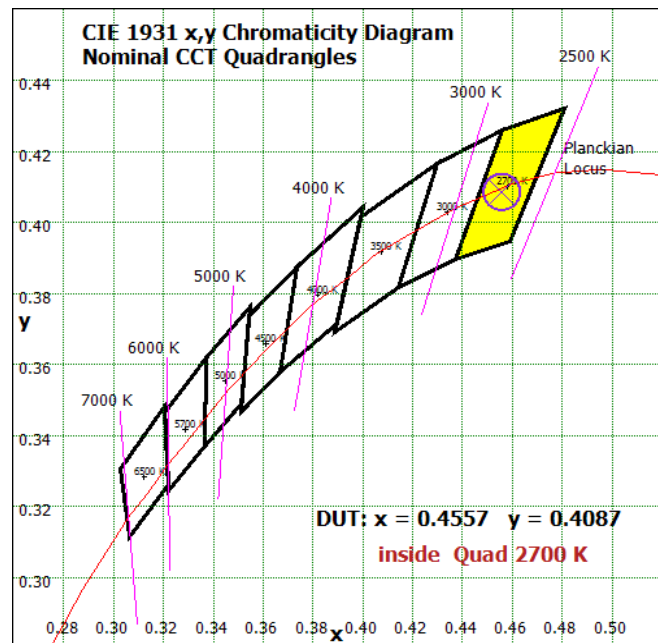
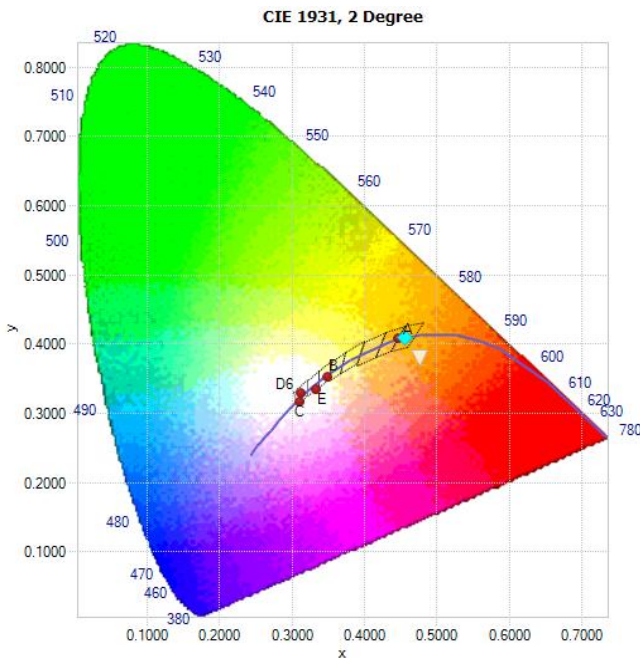


Chromaticity Coordinates

x	y	u	v	u'	v'	Duv
0.4557	0.4087	0.2607	0.3507	0.2607	0.5260	0.0005

Color Rendering Index Detail

Ra (CRI)	R1	R2	R3	R4	R5	R6	R7	R8	R9	R10	R11	R12	R13	R14
81.9	79.7	89.9	96.9	78.7	79.4	86.9	83.4	60.4	13.3	76.8	76.3	71.8	81.7	98.5





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	0.0327	422	0.340	494	1.73	566	5.58	638	6.17	710	1.28	782	0.152
351	0.0341	423	0.378	495	1.79	567	5.63	639	6.10	711	1.25	783	0.148
352	0.0346	424	0.422	496	1.84	568	5.69	640	6.03	712	1.22	784	0.143
353	0.0336	425	0.467	497	1.89	569	5.77	641	5.95	713	1.18	785	0.138
354	0.0310	426	0.514	498	1.94	570	5.82	642	5.87	714	1.15	786	0.134
355	0.0344	427	0.564	499	2.00	571	5.87	643	5.80	715	1.12	787	0.130
356	0.0338	428	0.621	500	2.05	572	5.95	644	5.72	716	1.09	788	0.127
357	0.0303	429	0.682	501	2.09	573	6.01	645	5.65	717	1.06	789	0.124
358	0.0330	430	0.745	502	2.15	574	6.10	646	5.56	718	1.03	790	0.119
359	0.0330	431	0.816	503	2.20	575	6.15	647	5.48	719	0.999	791	0.117
360	0.0376	432	0.887	504	2.24	576	6.22	648	5.41	720	0.971	792	0.113
361	0.0344	433	0.964	505	2.29	577	6.28	649	5.32	721	0.941	793	0.110
362	0.0328	434	1.05	506	2.34	578	6.33	650	5.25	722	0.915	794	0.106
363	0.0320	435	1.13	507	2.39	579	6.40	651	5.16	723	0.889	795	0.102
364	0.0331	436	1.23	508	2.43	580	6.45	652	5.08	724	0.863	796	0.100
365	0.0313	437	1.32	509	2.46	581	6.52	653	4.99	725	0.837	797	0.0975
366	0.0319	438	1.43	510	2.52	582	6.57	654	4.90	726	0.814	798	0.0948
367	0.0330	439	1.55	511	2.56	583	6.65	655	4.83	727	0.790	799	0.0925
368	0.0342	440	1.69	512	2.59	584	6.73	656	4.74	728	0.765	800	0.0897
369	0.0300	441	1.83	513	2.64	585	6.77	657	4.65	729	0.745	801	0.0870
370	0.0347	442	1.99	514	2.67	586	6.84	658	4.57	730	0.724	802	0.0840
371	0.0339	443	2.16	515	2.71	587	6.89	659	4.48	731	0.703	803	0.0816
372	0.0319	444	2.34	516	2.76	588	6.95	660	4.41	732	0.680	804	0.0799
373	0.0299	445	2.51	517	2.80	589	6.99	661	4.32	733	0.659	805	0.0776
374	0.0330	446	2.67	518	2.84	590	7.04	662	4.24	734	0.641	806	0.0752
375	0.0314	447	2.81	519	2.88	591	7.11	663	4.15	735	0.621	807	0.0735
376	0.0307	448	2.93	520	2.91	592	7.15	664	4.06	736	0.602	808	0.0711
377	0.0339	449	2.99	521	2.96	593	7.18	665	3.98	737	0.585	809	0.0694
378	0.0319	450	3.02	522	2.99	594	7.23	666	3.90	738	0.567	810	0.0675
379	0.0329	451	3.00	523	3.05	595	7.26	667	3.82	739	0.550	811	0.0647
380	0.0349	452	2.93	524	3.09	596	7.30	668	3.74	740	0.534	812	0.0634
381	0.0335	453	2.83	525	3.12	597	7.32	669	3.66	741	0.517	813	0.0620
382	0.0343	454	2.68	526	3.17	598	7.36	670	3.58	742	0.502	814	0.0606
383	0.0339	455	2.52	527	3.21	599	7.39	671	3.50	743	0.487	815	0.0586
384	0.0332	456	2.35	528	3.26	600	7.40	672	3.43	744	0.472	816	0.0574
385	0.0353	457	2.20	529	3.30	601	7.44	673	3.35	745	0.458	817	0.0561
386	0.0359	458	2.06	530	3.36	602	7.45	674	3.28	746	0.447	818	0.0544
387	0.0367	459	1.93	531	3.40	603	7.45	675	3.20	747	0.433	819	0.0527
388	0.0388	460	1.84	532	3.44	604	7.48	676	3.13	748	0.421	820	0.0521
389	0.0388	461	1.76	533	3.51	605	7.48	677	3.05	749	0.409	821	0.0497
390	0.0390	462	1.69	534	3.54	606	7.47	678	2.99	750	0.397	822	0.0492
391	0.0404	463	1.63	535	3.59	607	7.50	679	2.92	751	0.385	823	0.0477
392	0.0402	464	1.59	536	3.65	608	7.49	680	2.85	752	0.373	824	0.0467
393	0.0426	465	1.54	537	3.69	609	7.48	681	2.78	753	0.363	825	0.0461
394	0.0436	466	1.49	538	3.76	610	7.48	682	2.72	754	0.351	826	0.0435
395	0.0446	467	1.44	539	3.81	611	7.47	683	2.65	755	0.341	827	0.0424
396	0.0474	468	1.38	540	3.88	612	7.47	684	2.59	756	0.331	828	0.0408
397	0.0482	469	1.34	541	3.92	613	7.44	685	2.52	757	0.322	829	0.0399
398	0.0506	470	1.29	542	4.00	614	7.44	686	2.46	758	0.312	830	0.0390
399	0.0531	471	1.25	543	4.04	615	7.41	687	2.40	759	0.303	831	0.0383
400	0.0542	472	1.20	544	4.09	616	7.40	688	2.35	760	0.295	832	0.0373
401	0.0551	473	1.17	545	4.17	617	7.36	689	2.28	761	0.285	833	0.0362
402	0.0582	474	1.16	546	4.21	618	7.33	690	2.22	762	0.276	834	0.0358
403	0.0615	475	1.14	547	4.29	619	7.29	691	2.17	763	0.268	835	0.0347
404	0.0659	476	1.13	548	4.34	620	7.26	692	2.11	764	0.260	836	0.0337
405	0.0715	477	1.14	549	4.40	621	7.23	693	2.06	765	0.252	837	0.0331
406	0.0763	478	1.14	550	4.48	622	7.16	694	2.00	766	0.246	838	0.0313
407	0.0814	479	1.15	551	4.53	623	7.14	695	1.95	767	0.238	839	0.0305
408	0.0868	480	1.18	552	4.61	624	7.08	696	1.90	768	0.230	840	0.0302
409	0.0945	481	1.20	553	4.68	625	7.01	697	1.85	769	0.223	841	0.0297
410	0.103	482	1.23	554	4.74	626	6.98	698	1.80	770	0.216	842	0.0290
411	0.112	483	1.26	555	4.82	627	6.91	699	1.75	771	0.210	843	0.0283
412	0.123	484	1.30	556	4.88	628	6.85	700	1.70	772	0.205	844	0.0274
413	0.135	485	1.33	557	4.96	629	6.81	701	1.65	773	0.198	845	0.0278
414	0.148	486	1.36	558	5.02	630	6.73	702	1.61	774	0.192	846	0.0252
415	0.164	487	1.40	559	5.10	631	6.66	703	1.56	775	0.187	847	0.0260
416	0.182	488	1.45	560	5.16	632	6.59	704	1.52	776	0.182	848	0.0256
417	0.204	489	1.49	561	5.23	633	6.54	705	1.48	777	0.176	849	0.0244
418	0.225	490	1.53	562	5.29	634	6.46	706	1.44	778	0.170	850	0.0237
419	0.250	491	1.58	563	5.37	635	6.38	707	1.40	779	0.166		
420	0.278	492	1.63	564	5.44	636	6.31	708	1.36	780	0.161		
421	0.308	493	1.68	565	5.49	637	6.25	709	1.32	781	0.156		



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Photometric Indoor Test Report

Relevant Standards
IES LM-79-2008
ANSI C82.77-2002

Prepared For
Lighting Science Group Corporation
Ivars Lauzums
1227 South Patrick Dr.
Satellite Beach, FL 32937-3970

Catalog Number
xxx B11 40WE W27 120 G1 BX
Project Number
10151501
Test Number
432165

Test Date

2013-12-23

Prepared By

A handwritten signature in black ink, appearing to read 'Jeff A. Smith Jr.'.

Jeff Smith Jr., Project Handler

Approved By

A handwritten signature in black ink, appearing to read 'Jeffrey M. Lockner'.

Jeffrey Lockner, Engineer

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Lamp Description: Formed white plastic housing, clear plastic enclosure
Catalog Number: xxx B11 40WE W27 120 G1 BX
Lamp: One white LED array with clear and frosted plastic optic
Mounting: VBU

Lamp

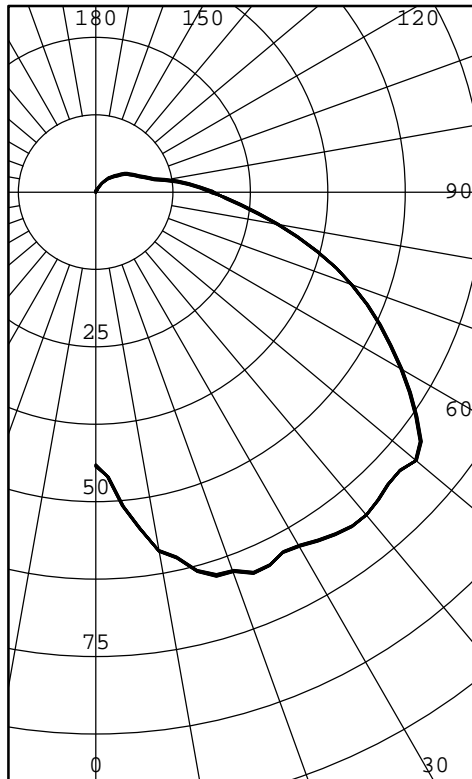


Test Conditions

Test Temperature:	24.1 °C
Voltage:	120.0 VAC
Current:	0.03931 A
Power:	4.229 W
Power Factor:	0.896
Frequency:	60 Hz
Current THD:	43.7 %



INTENSITY (CANDLEPOWER) SUMMARY



ANGLE	MEAN CP	LMS.	ANGLE	MEAN CP	LMS.
0	44		90	19	
5	51	5	95	15	17
10	59		100	11	
15	63	18	105	9	10
20	65		110	8	
25	67	31	115	7	7
30	66		120	6	
35	68	42	125	5	5
40	68		130	4	
45	67	52	135	3	3
50	67		140	3	
55	63	56	145	2	1
60	57		150	1	
65	51	50	155	1	0
70	44		160	0	
75	37	39	165	0	0
80	30		170	0	
85	24	26	175	0	0
90	19		180	0	

ZONAL LUMENS AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	54	14.87
0-40	96	26.59
0-60	204	56.59
0-90	319	88.52
40-90	223	61.94
60-90	115	31.93
90-180	41	11.48
0-180	361	100.00

EFFICACY (LUMENS PER WATT): 85.9

*** THIS IS AN ABSOLUTE TEST ***

LUMINOUS EFFICIENCY 1.500 INS

LUMINANCE SUMMARY CD./SQ.M.

S/MH: 2.1
 SC: 2.1

ANGLE	MEAN CD/SQ M
45	32633
55	26663
65	19292
75	13273
85	8167

TESTED IN ACCORDANCE WITH IES PROCEDURES.



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INTENSITY (CANDLEPOWER) DATA

ANGLE	INTENSITY (CANDLEPOWER)	LUMENS
0	44	
5	51	5
10	59	
15	63	18
20	65	
25	67	31
30	66	
35	68	42
40	68	
45	67	52
50	67	
55	63	56
60	57	
65	51	50
70	44	
75	37	39
80	30	
85	24	26
90	19	
95	15	17
100	11	
105	9	10
110	8	
115	7	7
120	6	
125	5	5
130	4	
135	3	3
140	3	
145	2	1
150	1	
155	1	0
160	0	
165	0	0
170	0	
175	0	0
180	0	



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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	0			
RCR	0	1.201	.201	.201	.20	1.161	.161	.161	.16	1.121	.121	.121	.12	1.051	.051	.051	.05	0.980	.980	.98	0.920	.920	.92	0.89	
	1	1.071	.010	.950	.90	1.030	.980	.920	.88	0.990	.940	.890	.85	0.880	.840	.80	0.820	.790	.76	0.760	.740	.71	0.68		
	2	0.960	.870	.780	.71	0.930	.830	.760	.69	0.890	.800	.730	.67	0.750	.690	.64	0.700	.650	.61	0.650	.610	.58	0.55		
	3	0.870	.740	.650	.57	0.840	.720	.630	.56	0.800	.690	.610	.54	0.650	.580	.52	0.600	.550	.49	0.560	.510	.47	0.44		
	4	0.800	.650	.550	.47	0.760	.630	.540	.46	0.730	.610	.520	.45	0.570	.490	.44	0.530	.470	.42	0.500	.440	.40	0.37		
	5	0.730	.570	.470	.39	0.690	.550	.460	.39	0.660	.540	.450	.38	0.500	.420	.36	0.470	.400	.35	0.440	.380	.33	0.31		
	6	0.660	.510	.400	.33	0.630	.490	.390	.33	0.610	.470	.380	.32	0.440	.360	.31	0.410	.350	.29	0.390	.330	.28	0.26		
	7	0.600	.450	.350	.28	0.580	.430	.340	.28	0.550	.420	.330	.27	0.390	.310	.26	0.370	.300	.25	0.350	.280	.24	0.21		
	8	0.550	.400	.310	.24	0.530	.390	.300	.24	0.510	.380	.290	.23	0.350	.280	.22	0.330	.260	.21	0.310	.250	.21	0.18		
	9	0.510	.360	.270	.20	0.490	.350	.260	.20	0.470	.340	.260	.20	0.320	.240	.19	0.300	.230	.18	0.280	.220	.18	0.16		
	10	0.470	.330	.230	.18	0.450	.320	.230	.18	0.440	.310	.230	.17	0.290	.220	.17	0.270	.200	.16	0.260	.200	.15	0.13		

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.