

Project Number
17.02452



Date
9/14/2017
Rev 1: 9/20/2017

Lab 6
Sphere

Test Sample Description

Catalog Number: CML1-3143-835-EDU
Description: Mirror-Light with 36x6 LEDs; Mirror Attached

Revision 1: Sphere report updated with results for sample with the mirror masked with white paper

Photometry

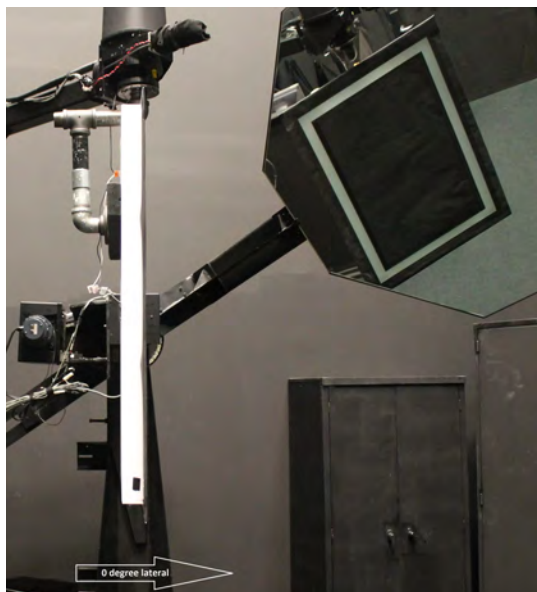
Test Method: IES LM-79-08 § 10
Preburn Time: 0:30
Time To Stabilize: 0:45
Total Operating Time: 3:15

Input Voltage (Volts): 120.1
Input Current (Amps): 0.304
Input Wattage (Watts): 36.2
Ambient Temp (°C): 24.4

Sphere

Test Method: IES LM-79-08 § 9.1 & 12.1
Preburn Time: 0:10
Time To Stabilize: 1:22
Total Operating Time: 1:32

Input Voltage (Volts): 120.0
Input Current (Amps): 0.305
Input Wattage (Watts): 36.1
Ambient Temp (°C): 24.0
PF @ 277V: 0.896
THD @ 277V (%): 15.8



Hubbell Lighting, Inc.

701 Millennium Boulevard
Greenville, SC 29607
www.hubbellighting.com

Checked (sphere): B. LEE
Checked (photometry): M. ELLMANN
Approved: P. McCARTHY



This report shall not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

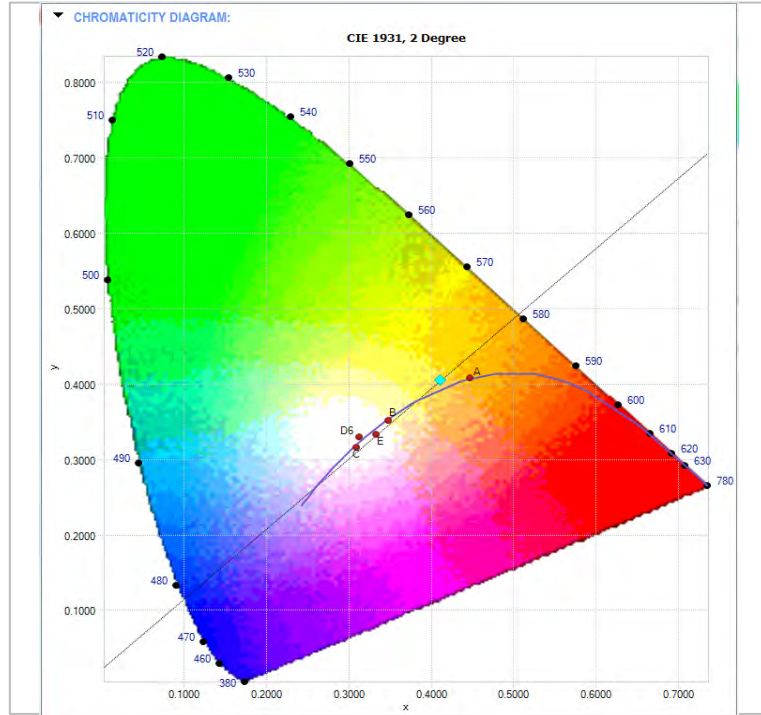


Lamp Cat#: NF2L757GR-V1
 Lamp Desc: 216 - Nichia 3500K LEDs
 Driver Desc: 1 - LG PIFN-H040A

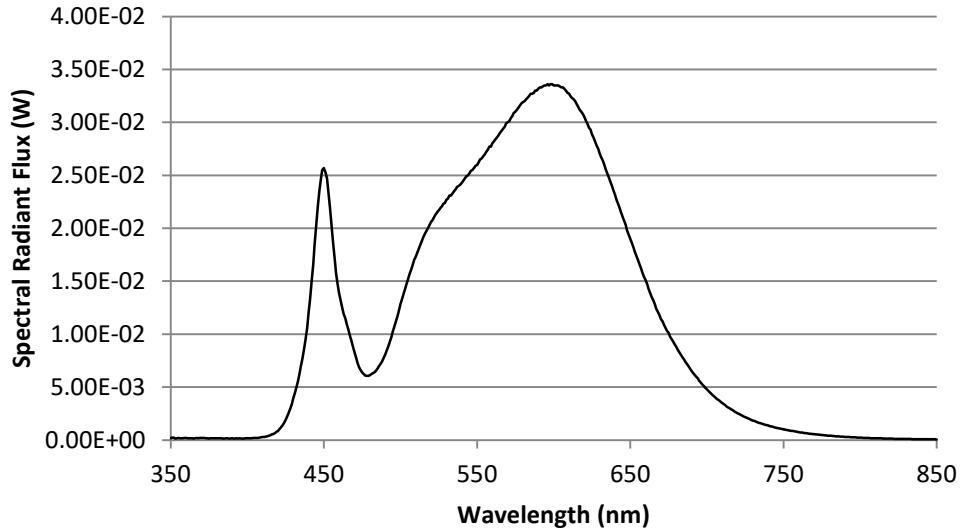
Efficacy: 52.0 LPW S/P Ratio: 1.5 LM/LM

Spectral Results

Name	Value	Unit
Φ	5.52	watts
$\Phi(v)$	1877	lumens
$\Phi(v')$	2740	lm'
Chrom x	0.4111	
Chrom y	0.4055	
Chrom u	0.2335	
Chrom v	0.3454	
Duv	0.0049	
Chrom u'	0.2335	
Chrom v'	0.5181	
CCT	3491	K
Purity	45.1	%
λ (dom)	579.0	nm
FWHM	147.2	nm
λ (peak)	598.7	nm
λ (center)	582.1	nm
λ (centroid)	574.0	nm
SDCM	Cool White	
RA	81	
Corr. Coef.	0.005084908	
Correlation	0.0054	
R1	78.3	
R2	85.9	
R3	93.3	
R4	80.5	
R5	77.7	
R6	81.1	
R7	86.6	
R8	62.2	
R9	3.4	
R10	67.2	
R11	78.8	
R12	56.7	
R13	79.6	
R14	96.0	



Spectral Distribution of Radiant Flux



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LUMINAIRE: Mirror-Light with 36x6 LEDs; Mirror Attached

LAMP CAT. NO.: NF2L757GR-V1

LAMP: 216- Nichia 3500K LEDs

BALLAST CATALOG NUMBER: PIFN-H040A

BALLAST: 1- LG - Programmed to 960mA

REFRACTOR: Etched Glass

MOUNTING: Surface

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.



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CANDELA DISTRIBUTION

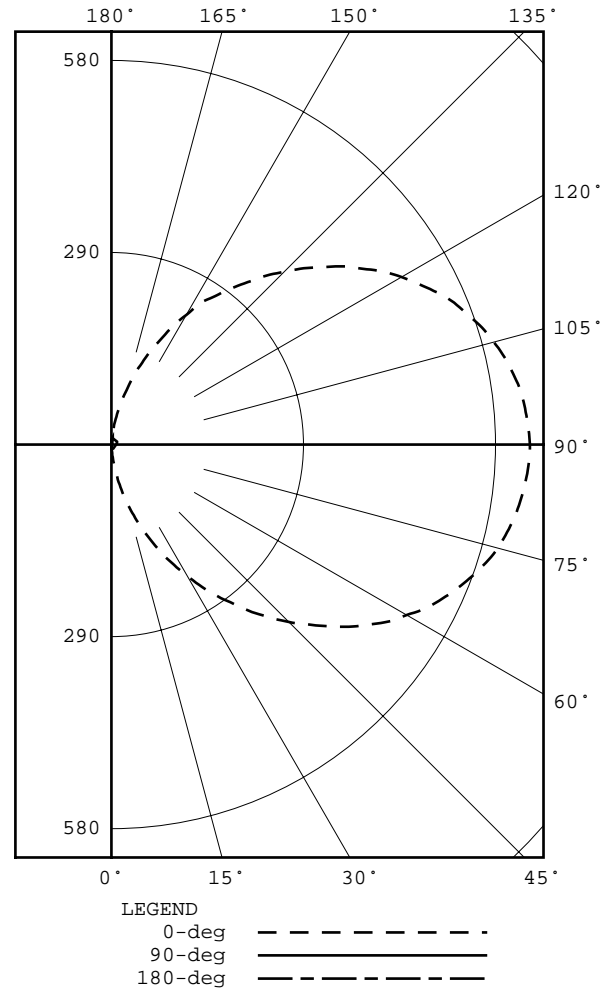
	0.0	45.0	90.0	135.0	180.0	
0	3	3	3	3	3	
5	16	10	6	2	1	1
15	91	54	6	4	0	8
25	182	111	7	5	0	25
35	280	170	7	5	0	52
45	379	227	7	5	0	85
55	474	283	7	6	0	122
65	551	327	7	7	1	157
75	604	357	7	8	2	183
85	628	372	7	8	2	197
90	632	374	7	7	1	
95	627	371	7	8	1	196
105	598	353	8	7	1	181
115	543	321	9	7	1	155
125	463	275	10	7	2	121
135	369	220	10	7	2	84
145	274	162	10	8	3	51
155	174	103	10	7	3	25
165	81	48	9	21	3	8
175	14	9	9	5	3	1
180	5	5	5	5	5	

FLUX

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	35	2.1
0- 40	86	5.2
0- 60	294	17.8
0- 90	831	50.3
90-120	532	32.2
90-130	652	39.5
90-150	787	47.6
90-180	822	49.7
0-180	1653	100.0

EFFICACY = 45.7 lm/W
CIE TYPE - GENERAL DIFFUSE





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PLANE : 0-DEG 90-DEG
LUMINOUS LENGTH :999.990 26.000
HEIGHT OF SIDE :38.000 38.000

LUMINANCE DATA IN CANDELA/SQ M
ANGLE AVERAGE AVERAGE AVERAGE
IN DEG 0-DEG 90-DEG 180-DEG
45 31. 0. 0.
55 47. 0. 0.
65 72. 0. 0.
75 122. 0. 0.
85 299. 0. 1.



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CANDELA DISTRIBUTION
LATERAL ANGLE

	0.0	5.0	15.0	25.0	35.0	45.0	55.0	65.0	75.0	85.0	90.0	95.0	105.0	115.0
0.0	3	3	3	3	3	3	3	3	3	3	3	3	3	3
2.5	5	5	5	5	4	4	4	5	5	6	6	6	6	5
5.0	16	16	15	14	12	10	8	6	6	6	6	6	6	5
7.5	32	32	30	28	24	19	14	10	7	6	7	7	7	6
10.0	50	49	47	43	37	30	22	14	8	6	6	7	7	6
12.5	70	69	66	60	52	42	31	20	11	6	6	7	8	7
15.0	91	90	86	79	68	54	40	26	13	7	6	8	9	7
17.5	112	111	106	97	85	68	50	32	16	7	6	8	9	8
20.0	135	134	128	117	101	81	60	39	19	7	6	9	10	8
22.5	157	158	150	137	119	95	71	45	23	8	6	10	11	9
25.0	182	181	173	159	136	111	81	53	26	8	7	10	11	9
27.5	205	203	195	178	154	125	92	59	30	8	7	11	12	10
30.0	229	227	218	199	173	140	103	67	33	9	7	12	12	10
32.5	255	253	242	221	191	154	114	74	36	10	7	12	13	10
35.0	280	278	265	243	210	170	125	81	40	10	7	13	13	11
37.5	303	302	288	263	228	185	136	88	44	11	7	14	14	11
40.0	330	327	312	286	247	199	146	95	47	11	7	15	14	11
42.5	354	351	336	307	266	214	159	102	50	12	7	15	14	11
45.0	379	376	360	329	283	227	169	109	54	12	7	16	14	11
47.5	402	402	383	350	302	242	179	116	57	13	7	17	15	12
50.0	427	425	407	370	319	256	189	122	61	14	7	17	15	12
52.5	452	449	429	391	336	269	199	129	64	14	7	18	15	12
55.0	474	471	449	410	353	283	208	135	67	15	7	19	15	12
57.5	497	493	471	429	369	294	217	141	70	15	7	19	16	12
60.0	515	513	490	446	383	306	225	147	73	16	7	20	16	12
62.5	535	531	507	463	397	317	234	152	76	16	7	20	16	13
65.0	551	549	523	477	409	327	241	158	78	17	7	21	16	13
67.5	566	563	538	491	421	336	247	162	80	17	7	21	16	13
70.0	580	577	551	502	431	344	253	166	83	17	7	22	16	13
72.5	593	589	562	513	441	352	259	170	84	18	7	22	17	13
75.0	604	600	573	523	449	357	263	173	86	18	7	22	16	13
77.5	612	608	582	530	455	363	267	176	87	18	7	23	17	14
80.0	619	616	588	537	460	367	270	178	89	18	7	23	17	14
82.5	624	621	593	541	465	370	273	179	90	19	7	23	17	14
85.0	628	625	597	545	468	372	274	180	90	19	7	23	17	14
87.5	631	627	599	547	469	374	275	181	90	19	7	23	17	13
90.0	632	628	600	548	470	374	276	181	90	18	7	23	16	13
92.5	630	626	599	546	469	373	274	181	90	18	7	23	16	13
95.0	627	623	595	543	466	371	273	180	89	18	7	23	16	13
97.5	623	619	591	539	463	368	271	178	89	18	8	23	16	13
100.0	616	612	585	533	457	364	268	176	87	18	8	23	16	13
102.5	608	604	577	526	451	359	264	174	86	18	8	23	16	13
105.0	598	595	568	517	444	353	260	171	84	18	8	22	16	13
107.5	587	582	557	507	435	346	255	167	82	18	9	22	16	13
110.0	573	570	544	496	426	339	249	164	80	18	9	22	16	13
112.5	560	555	530	483	414	331	243	159	80	18	9	21	16	13
115.0	543	540	516	469	403	321	236	154	79	18	9	21	16	13
117.5	524	522	498	453	389	311	229	148	76	17	10	21	16	13
120.0	506	504	479	437	376	300	220	143	74	17	10	22	16	13
122.5	486	482	460	420	360	288	213	139	71	16	10	21	16	13
125.0	463	461	440	400	344	275	202	136	68	16	10	20	16	13
127.5	442	437	418	381	328	263	194	129	64	15	10	19	16	13
130.0	417	415	396	361	311	248	186	123	61	15	10	18	16	13
132.5	394	390	373	341	292	235	179	115	57	14	10	18	16	13
135.0	369	367	351	319	273	220	167	107	53	13	10	17	16	13
137.5	346	342	328	298	254	209	155	100	47	13	10	16	16	13
140.0	320	319	305	275	239	194	142	92	44	13	10	16	15	13
142.5	297	293	280	257	223	179	131	84	40	12	10	15	15	13
145.0	274	273	260	238	204	162	120	75	36	12	10	15	14	12
147.5	255	251	240	219	184	148	108	67	32	11	10	14	20	12



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CANDELA DISTRIBUTION
LATERAL ANGLE

	0.0	5.0	15.0	25.0	35.0	45.0	55.0	65.0	75.0	85.0	90.0	95.0	105.0	115.0
150.0	226	226	216	195	165	134	97	58	29	11	10	14	19	12
152.5	202	199	193	175	147	119	86	51	25	10	10	13	15	11
155.0	174	175	169	154	130	103	73	44	22	10	10	12	13	12
157.5	151	150	146	134	113	88	61	38	19	10	10	12	12	17
160.0	127	127	124	113	96	72	51	32	17	9	10	12	12	18
162.5	105	104	101	91	75	59	42	25	14	9	9	11	11	15
165.0	81	82	77	69	59	48	33	20	12	9	9	10	11	10
167.5	62	61	57	52	45	37	26	16	11	9	9	10	10	9
170.0	43	43	40	36	32	26	18	13	9	8	9	10	10	9
172.5	27	27	25	22	21	17	12	10	9	9	9	9	10	8
175.0	14	14	14	12	10	9	8	7	8	9	9	9	9	8
177.5	5	5	6	5	4	4	6	6	8	9	9	9	9	7
180.0	5	5	5	5	5	5	5	5	5	5	5	5	5	5



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CANDELA DISTRIBUTION
LATERAL ANGLE

	125.0	135.0	145.0	155.0	165.0	175.0	180.0
0.0	3	3	3	3	3	3	3
2.5	4	2	1	1	1	1	1
5.0	4	2	2	1	1	1	1
7.5	4	3	2	1	1	1	1
10.0	5	3	2	1	1	1	1
12.5	5	4	2	1	1	1	0
15.0	6	4	2	1	1	1	0
17.5	6	4	2	1	1	0	0
20.0	6	4	2	1	1	0	0
22.5	7	4	3	2	1	0	0
25.0	7	5	3	2	1	0	0
27.5	7	5	3	2	1	0	0
30.0	8	5	3	2	1	0	0
32.5	8	5	3	2	1	0	0
35.0	8	5	3	2	1	0	0
37.5	8	5	3	2	1	0	0
40.0	8	5	3	2	1	0	0
42.5	8	6	3	2	1	0	0
45.0	8	5	3	2	1	0	0
47.5	8	6	4	2	1	0	0
50.0	9	6	4	2	1	0	0
52.5	9	6	4	2	1	0	0
55.0	9	6	4	3	1	0	0
57.5	9	6	4	3	2	1	0
60.0	9	7	4	3	2	1	0
62.5	9	7	5	3	2	1	0
65.0	10	7	5	3	2	1	1
67.5	10	7	5	3	2	1	1
70.0	10	7	5	4	3	1	1
72.5	10	8	5	4	3	2	1
75.0	10	8	6	4	3	2	2
77.5	10	8	6	5	4	3	2
80.0	11	8	7	5	4	3	3
82.5	11	9	7	5	4	3	3
85.0	11	8	6	5	4	3	2
87.5	10	8	6	4	3	2	1
90.0	10	7	5	4	3	1	1
92.5	11	8	6	4	3	1	1
95.0	10	8	6	4	3	2	1
97.5	10	8	6	4	3	2	1
100.0	10	7	5	4	3	1	1
102.5	10	7	5	4	3	1	1
105.0	10	7	5	4	2	1	1
107.5	10	7	5	4	2	1	1
110.0	10	7	5	4	3	1	1
112.5	10	7	5	4	3	1	1
115.0	10	7	5	4	3	2	1
117.5	10	7	6	4	3	2	1
120.0	10	7	6	4	3	2	2
122.5	10	7	5	4	3	2	2
125.0	10	7	5	4	3	2	2
127.5	10	7	5	4	3	2	2
130.0	10	7	5	4	3	2	2
132.5	10	7	6	4	3	2	2
135.0	10	7	5	4	3	2	2
137.5	10	8	6	4	3	3	2
140.0	10	8	6	4	3	3	2
142.5	10	8	6	5	4	3	3
145.0	10	8	6	5	4	3	3
147.5	10	8	6	5	4	3	3



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LATERAL ANGLE

	125.0	135.0	145.0	155.0	165.0	175.0	180.0
150.0	10	8	6	5	4	3	3
152.5	9	8	6	5	4	4	3
155.0	9	7	6	5	4	3	3
157.5	9	7	6	5	4	4	3
160.0	9	7	6	5	4	4	3
162.5	15	7	6	5	4	3	3
165.0	15	21	6	5	4	4	3
167.5	10	20	19	8	4	4	3
170.0	7	8	19	15	15	11	11
172.5	6	5	5	4	5	7	4
175.0	6	5	5	4	3	3	3
177.5	6	5	4	3	3	3	2
180.0	5	5	5	5	5	5	5



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5-DEGREE ZONAL LUMEN SUMMARY		
0- 5		0
5- 10		1
10- 15		3
15- 20		6
20- 25		10
25- 30		15
30- 35		22
35- 40		30
40- 45		38
45- 50		47
50- 55		57
55- 60		66
60- 65		75
65- 70		82
70- 75		89
75- 80		94
80- 85		98
85- 90		99
90- 95		99
95-100		97
100-105		93
105-110		88
110-115		81
115-120		74
120-125		65
125-130		56
130-135		47
135-140		38
140-145		29
145-150		22
150-155		15
155-160		10
160-165		6
165-170		3
170-175		1
175-180		0

10-DEGREE ZONAL LUMEN SUMMARY		
0- 10		1
10- 20		8
20- 30		25
30- 40		52
40- 50		85
50- 60		122
60- 70		157
70- 80		183
80- 90		197
90-100		196
100-110		181
110-120		155
120-130		121
130-140		84
140-150		51
150-160		25
160-170		8
170-180		1



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COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

EFFECTIVE FLOOR CAVITY REFLECTANCE 0.20

RC	80				70				50			30			10			0	
	RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30		10
0	107	107	107	107	107	99	99	99	99	83	83	83	69	69	69	56	56	56	50
1	92	85	78	73	73	84	78	72	67	64	60	56	52	48	45	40	38	35	30
2	81	71	62	55	55	74	64	57	50	53	47	41	42	37	33	32	28	25	20
3	73	60	50	43	43	66	55	46	39	44	38	32	35	30	25	26	22	19	14
4	65	52	42	34	34	59	47	38	31	38	31	26	30	25	20	22	18	15	11
5	59	45	36	28	28	54	41	32	26	34	26	21	26	21	16	20	15	12	8
6	54	40	31	24	24	49	37	28	22	30	23	18	23	18	14	17	13	10	6
7	50	36	27	20	20	45	33	24	18	27	20	15	21	15	11	15	11	8	5
8	46	32	23	17	17	42	29	21	16	24	17	13	19	14	10	14	10	7	4
9	43	29	21	15	15	39	27	19	14	22	15	11	17	12	8	13	9	6	4
10	40	26	18	13	13	36	24	17	12	20	14	10	16	11	7	12	8	5	3

ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS TEST SAMPLE.

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Date
9/14/2017
Rev 1: 9/20/2017

Goniophotometer Calibration

Calibration Lamp: GE 1000W, 120V, T6, CL (FEL)

Lamp Number: ITL78966-1000-38

Calibration Current: 8.300 Amps DC

Total Luminous Flux: 25889.0 Lumens

Calibration Date: 09/2/2016

Test Equipment Used

<i>Instrument</i>	<i>Manufacturer / Model</i>	<i>S/N</i>	<i>Calibration Due:</i>
<i>Goniophotometer</i>	ITL/HLI LAB 6 - Test Distance: 31.3'	N/A	N/A
<i>Power Analyzer</i>	Yokogawa / WT 332	C2QA27076V	11/2/2017
<i>Power Source</i>	Voltage-Regulated House Power	N/A	N/A
<i>Thermometer</i>	National Instruments / USB-TC01	1912745	11/7/2017

Sphere Calibration

Calibration Lamp: EIKO 28V75W/E10

Lamp Number: SCL-1400-J136

Calibration Current: 2.679 Amps

Total Luminous Flux: 1427 Lumens

Test Equipment Used - Color & SPD; THD & Power Factor

<i>Instrument</i>	<i>Manufacturer / Model</i>	<i>S/N</i>	<i>Calibration Due:</i>
<i>3-Meter Sphere</i>	Labsphere / LMS-3M	N/A	Calibrated Weekly
<i>Thermometer</i>	National Instruments / USB TC01	1912751	11/2/2017
<i>LAMP Power Meter</i>	Yokogawa / WT332	C2QA27075V	11/1/2017
<i>Power Supply</i>	Chroma / 61602	616020002113	N/A
<i>Power Supply PF/THD</i>	Voltage-Regulated House Power	N/A	N/A
<i>Aux Lamp Supply</i>	Labsphere / LPS-100-0833	031159372	10/31/2017
<i>Cal Lamp Supply</i>	Labsphere / LPS-150-0268	1218148505	12/1/2017
<i>Spectrometer</i>	Labsphere / CDS 1100	0624117792	N/A

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This report shall not be used to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.