

Project Number  
17.02412



Date  
8/31/2017

LAB 6  
Sphere

**Test Sample Description**

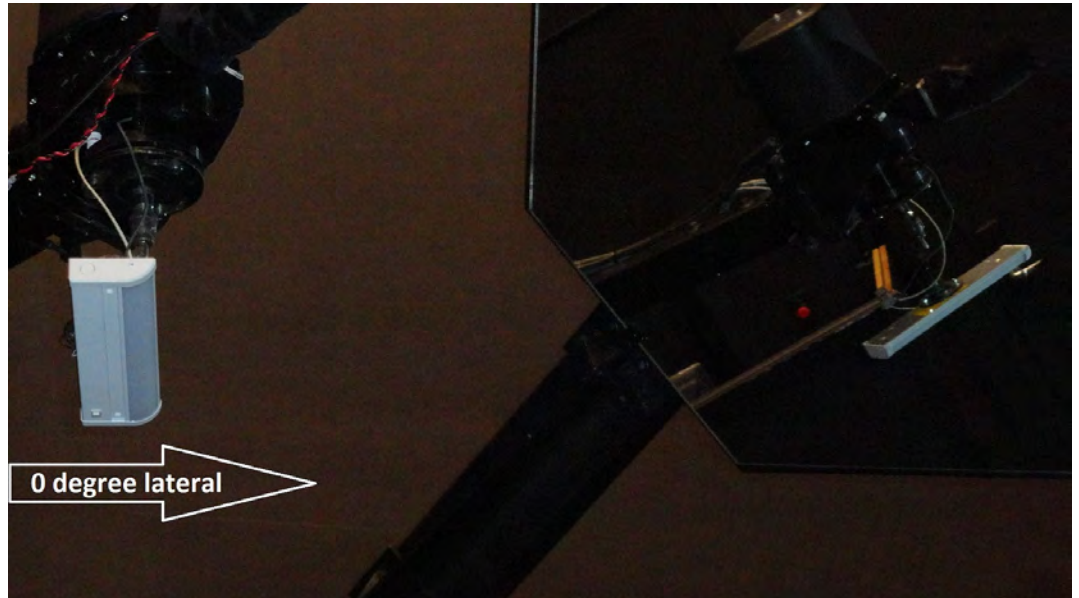
Catalog Number: P700001-028-30  
Description: 12" Linear Under-Cabinet. White

**Photometry**

Test Method: IES LM-79-08 § 10  
Preburn Time: 2:55  
Time To Stabilize: 0:40  
Total Operating Time: 5:30  
  
Input Voltage (Volts): 120.0  
Input Current (Amps): 0.064  
Input Wattage (Watts): 7.6  
Ambient Temp (°C): 24.1  
PF @120V: 0.993  
THD @120V (%): 11.54

**Sphere**

Test Method: IES LM-79-08 § 9.1 & 12.1  
Preburn Time: 1:00  
Time To Stabilize: 0:59  
Total Operating Time: 1:59  
  
Input Voltage (Volts): 120.0  
Input Current (Amps): 0.063  
Input Wattage (Watts): 7.5  
Ambient Temp (°C): 24.0



**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.

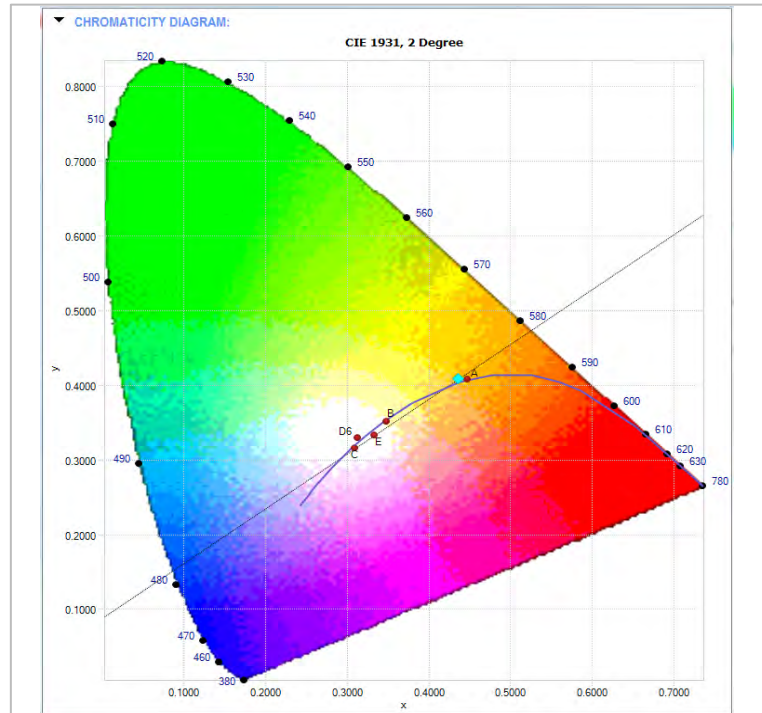


Lamp Cat#: SAW9A32E-E1  
 Lamp Desc: 28 - Seoul Semiconductor 3000K LEDs  
 Driver Desc: NA

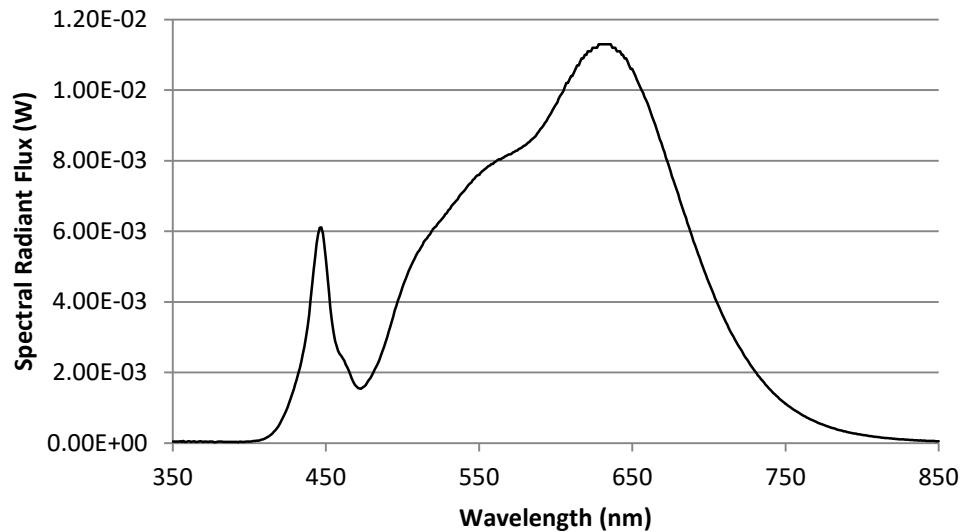
Efficacy: 75.1 LPW      S/P Ratio: 1.4 LM/LM

**Spectral Results**

Name	Value	Unit
$\Phi$	2.05	watts
$\Phi(v)$	563	lumens
$\Phi(v')$	788	lm'
Chrom x	0.4361	
Chrom y	0.4087	
Chrom u	0.2481	
Chrom v	0.3487	
Duv	0.0019	
Chrom u'	0.2481	
Chrom v'	0.5231	
CCT	3049	K
Purity	53.6	%
$\lambda$ (dom)	581.9	nm
FWHM	177.2	nm
$\lambda$ (peak)	632.5	nm
$\lambda$ (center)	602.0	nm
$\lambda$ (centroid)	598.6	nm
SDCM	Cool White	
RA	94	
Corr. Coef.	0.001951103	
Correlation	0.0054	
R1	95.3	
R2	94.0	
R3	91.3	
R4	94.6	
R5	94.0	
R6	92.0	
R7	94.9	
R8	92.0	
R9	78.8	
R10	85.3	
R11	95.2	
R12	81.4	
R13	94.6	
R14	94.4	



**Spectral Distribution of Radiant Flux**



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**LUMINAIRE:** 12" Linear Under-Cabinet. White

**LAMP:** 28- Seoul 3000K LEDs

**MOUNTING:** Surface

**NOTE:** DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.



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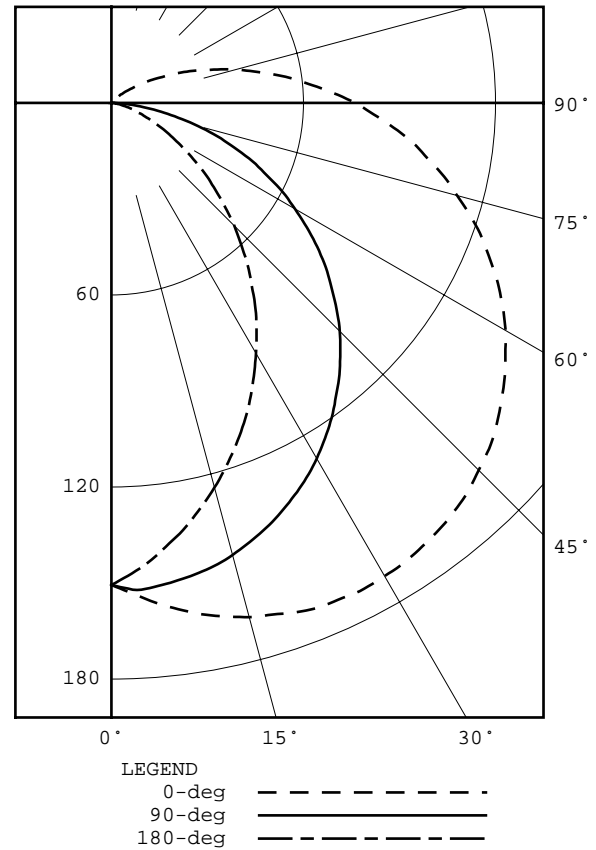
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CANDELA DISTRIBUTION						FLUX
	0.0	45.0	90.0	135.0	180.0	
0	151	151	151	151	151	
5	157	155	152	144	143	14
15	166	160	146	129	124	41
25	171	159	135	111	102	62
35	169	153	120	89	79	76
45	162	142	101	65	54	80
55	150	126	79	40	32	75
65	133	107	54	20	15	63
75	112	85	28	6	5	47
85	89	61	6	1	1	31
90	76	49	0	0	1	
95	63	37	0	0	0	19
105	40	18	0	0	0	10
115	21	7	0	0	0	4
125	8	2	0	0	0	2
135	2	1	0	0	0	0
145	1	1	0	0	0	0
155	0	0	0	0	0	0
165	0	0	0	0	0	0
175	0	0	0	0	0	0
180	0	0	0	0	0	0

ZONAL ZONE	LUMEN LUMENS	SUMMARY	%FIXT
0- 30	117		22.4
0- 40	193		36.8
0- 60	348		66.3
0- 90	490		93.3
90-120	33		6.3
90-130	35		6.6
90-150	35		6.7
90-180	35		6.7
0-180	525		100.0

EFFICACY = 69.0 lm/W  
CIE TYPE - DIRECT  
PLANE : 0-DEG 90-DEG 180-DEG  
SPACING CRITERIA : 1.67 1.26 0.94





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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	151	151	151	151	151	151	151	151	151	151	151	151	151	151
2.5	153	154	154	153	153	153	152	152	152	152	152	152	150	149
5.0	157	157	157	156	156	155	154	153	152	152	152	151	149	147
7.5	160	160	160	159	158	156	155	154	152	151	151	150	147	145
10.0	162	162	162	161	159	158	156	154	152	150	150	148	145	142
12.5	164	164	164	163	161	159	157	154	151	149	148	146	142	139
15.0	166	166	166	164	162	160	157	154	150	147	146	144	139	136
17.5	168	168	167	165	163	160	156	153	149	145	144	141	136	132
20.0	169	169	169	166	164	160	156	152	147	143	141	139	133	128
22.5	170	170	169	167	164	160	155	150	145	141	138	136	129	124
25.0	171	171	170	167	163	159	154	149	143	138	135	132	125	120
27.5	171	171	170	167	163	158	152	147	140	135	132	128	121	115
30.0	171	171	169	166	162	157	150	144	137	131	128	125	117	110
32.5	170	170	169	165	161	155	148	141	134	127	124	120	112	105
35.0	169	169	168	164	159	153	146	138	131	123	120	116	108	100
37.5	168	168	166	163	157	151	143	135	127	119	115	111	102	95
40.0	167	167	165	161	155	148	140	132	123	115	111	106	97	89
42.5	165	165	163	158	152	145	137	128	119	110	106	101	92	83
45.0	162	162	160	156	150	142	133	124	115	105	101	96	86	78
47.5	160	160	158	153	146	138	129	120	110	100	95	90	80	72
50.0	157	157	154	150	143	135	125	115	105	95	90	85	74	65
52.5	154	154	151	146	139	130	121	111	100	89	84	79	69	59
55.0	150	150	147	142	135	126	116	106	95	84	79	73	62	53
57.5	146	146	144	138	131	122	112	101	89	78	72	66	56	47
60.0	142	142	139	134	126	117	107	95	84	73	66	61	49	41
62.5	138	138	135	129	122	112	101	90	78	66	60	54	43	34
65.0	133	133	130	125	117	107	96	84	72	60	54	47	37	29
67.5	128	128	125	120	111	102	91	79	66	54	48	41	30	23
70.0	123	123	120	115	106	97	85	73	60	47	41	35	25	18
72.5	118	118	115	109	101	91	79	67	54	41	35	29	19	13
75.0	112	112	109	104	95	85	73	61	47	34	28	22	14	9
77.5	107	106	103	98	89	79	67	54	41	28	21	16	9	6
80.0	100	100	97	92	84	73	61	48	35	22	16	11	5	3
82.5	95	94	91	86	78	67	55	42	29	15	10	6	3	2
85.0	89	88	85	79	71	61	49	36	23	10	6	2	1	1
87.5	82	82	79	73	65	55	43	30	17	5	2	0	0	0
90.0	76	76	73	67	59	49	37	24	12	2	0	0	0	0
92.5	70	69	67	61	53	43	31	19	8	1	0	0	0	0
95.0	63	63	60	55	47	37	26	14	4	0	0	0	0	0
97.5	57	57	54	49	41	32	21	10	3	0	0	0	0	0
100.0	51	51	49	44	36	27	17	8	1	0	0	0	0	0
102.5	46	45	43	38	31	22	13	5	1	0	0	0	0	0
105.0	40	40	37	33	26	18	10	3	1	0	0	0	0	0
107.5	35	35	32	28	22	14	7	2	0	0	0	0	0	0
110.0	30	30	27	23	18	11	6	2	0	0	0	0	0	0
112.5	26	25	23	19	14	9	4	1	0	0	0	0	0	0
115.0	21	21	19	16	11	7	3	1	0	0	0	0	0	0
117.5	17	17	16	12	9	5	2	0	0	0	0	0	0	0
120.0	14	14	12	10	7	4	1	1	0	0	0	0	0	0
122.5	11	11	10	7	5	3	1	0	0	0	0	0	0	0
125.0	8	8	7	6	4	2	1	0	0	0	0	0	0	0
127.5	6	6	6	4	3	2	1	0	0	0	0	0	0	0
130.0	5	5	4	3	2	1	1	0	0	0	0	0	0	0
132.5	3	3	3	2	1	1	0	0	0	0	0	0	0	0
135.0	2	2	2	2	1	1	0	0	0	0	0	0	0	0
137.5	2	2	2	1	1	1	0	0	0	0	0	0	0	0
140.0	1	1	1	1	1	0	0	0	0	0	0	0	0	0
142.5	1	1	1	1	1	0	0	0	0	0	0	0	0	0
145.0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
147.5	1	1	1	1	0	0	0	0	0	0	0	0	0	0

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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	0	0	0	0	0	0	0	0	0	0	0	0	0	0
152.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
155.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
157.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
160.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
162.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
165.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
167.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
170.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
172.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
175.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
177.5	0	0	0	0	0	0	0	0	0	0	0	0	0	0
180.0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



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CANDELA DISTRIBUTION  
LATERAL ANGLE

	125.0	135.0	145.0	155.0	165.0	175.0	180.0
0.0	151	151	151	151	151	151	151
2.5	148	147	147	147	147	147	147
5.0	145	144	144	143	143	143	143
7.5	143	141	140	139	139	139	139
10.0	139	137	136	135	134	135	134
12.5	136	133	132	130	130	130	129
15.0	132	129	127	126	125	125	124
17.5	128	125	123	121	120	119	119
20.0	124	121	118	116	114	114	114
22.5	119	116	113	111	109	108	108
25.0	115	111	107	105	103	103	102
27.5	110	105	102	99	97	97	96
30.0	105	100	96	93	91	91	90
32.5	99	94	90	87	85	85	84
35.0	94	89	84	81	79	79	79
37.5	88	83	78	75	73	72	72
40.0	82	76	72	69	67	66	66
42.5	76	70	66	63	61	60	60
45.0	70	65	60	57	55	54	54
47.5	64	58	54	51	49	48	48
50.0	58	52	48	45	44	43	43
52.5	52	47	42	40	38	37	38
55.0	46	40	37	34	33	33	32
57.5	40	35	31	29	28	27	27
60.0	34	29	27	24	24	23	23
62.5	28	24	22	20	19	19	19
65.0	23	20	18	16	16	15	15
67.5	18	15	14	13	12	12	12
70.0	14	12	11	10	10	9	9
72.5	11	9	8	8	7	7	7
75.0	7	6	6	6	5	5	5
77.5	5	4	4	4	4	4	4
80.0	3	3	3	3	3	3	3
82.5	2	2	2	2	2	2	2
85.0	1	1	1	1	1	1	1
87.5	1	1	1	1	1	1	1
90.0	0	0	1	1	1	1	1
92.5	0	0	0	0	0	0	0
95.0	0	0	0	0	0	0	0
97.5	0	0	0	0	0	0	0
100.0	0	0	0	0	0	0	0
102.5	0	0	0	0	0	0	0
105.0	0	0	0	0	0	0	0
107.5	0	0	0	0	0	0	0
110.0	0	0	0	0	0	0	0
112.5	0	0	0	0	0	0	0
115.0	0	0	0	0	0	0	0
117.5	0	0	0	0	0	0	0
120.0	0	0	0	0	0	0	0
122.5	0	0	0	0	0	0	0
125.0	0	0	0	0	0	0	0
127.5	0	0	0	0	0	0	0
130.0	0	0	0	0	0	0	0
132.5	0	0	0	0	0	0	0
135.0	0	0	0	0	0	0	0
137.5	0	0	0	0	0	0	0
140.0	0	0	0	0	0	0	0
142.5	0	0	0	0	0	0	0
145.0	0	0	0	0	0	0	0
147.5	0	0	0	0	0	0	0



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	CANDELA DISTRIBUTION						
	LATERAL ANGLE						
	125.0	135.0	145.0	155.0	165.0	175.0	180.0
150.0	0	0	0	0	0	0	0
152.5	0	0	0	0	0	0	0
155.0	0	0	0	0	0	0	0
157.5	0	0	0	0	0	0	0
160.0	0	0	0	0	0	0	0
162.5	0	0	0	0	0	0	0
165.0	0	0	0	0	0	0	0
167.5	0	0	0	0	0	0	0
170.0	0	0	0	0	0	0	0
172.5	0	0	0	0	0	0	0
175.0	0	0	0	0	0	0	0
177.5	0	0	0	0	0	0	0
180.0	0	0	0	0	0	0	0





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5-DEGREE ZONAL LUMEN SUMMARY		
0- 5		4
5- 10		11
10- 15		17
15- 20		24
20- 25		29
25- 30		33
30- 35		37
35- 40		39
40- 45		40
45- 50		40
50- 55		39
55- 60		36
60- 65		33
65- 70		30
70- 75		26
75- 80		21
80- 85		17
85- 90		14
90- 95		11
95-100		8
100-105		6
105-110		4
110-115		3
115-120		2
120-125		1
125-130		1
130-135		0
135-140		0
140-145		0
145-150		0
150-155		0
155-160		0
160-165		0
165-170		0
170-175		0
175-180		0

10-DEGREE ZONAL LUMEN SUMMARY		
0- 10		14
10- 20		41
20- 30		62
30- 40		76
40- 50		80
50- 60		75
60- 70		63
70- 80		47
80- 90		31
90-100		19
100-110		10
110-120		4
120-130		2
130-140		0
140-150		0
150-160		0
160-170		0
170-180		0



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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
0	117	117	117	117	114	114	114	114	107	107	107	101	101	101	96	96	96	93
1	105	99	94	90	102	96	92	88	91	87	84	86	83	80	81	79	76	74
2	95	86	78	72	91	83	76	70	78	73	68	74	69	65	70	66	63	60
3	86	75	66	59	83	73	64	58	69	62	56	65	59	54	61	56	52	50
4	79	66	57	49	76	64	55	49	61	53	47	57	51	46	54	49	45	42
5	72	59	49	42	69	57	48	42	54	46	41	51	45	40	49	43	38	36
6	66	53	43	37	64	51	43	36	49	41	35	46	40	34	44	38	34	31
7	62	48	39	32	59	46	38	32	44	37	31	42	35	30	40	34	30	28
8	57	43	35	29	55	42	34	28	40	33	28	39	32	27	37	31	27	25
9	53	40	31	26	52	39	31	25	37	30	25	36	29	24	34	28	24	22
10	50	37	29	23	48	36	28	23	34	27	23	33	27	22	32	26	22	20

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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**HUBBELL**  
Lighting

Date  
8/31/2017

### *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>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

## **Hubbell Lighting, Inc.**

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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.*