

Project Number  
17.02425



Date  
9/5/2017

LAB 6  
Sphere

### Test Sample Description

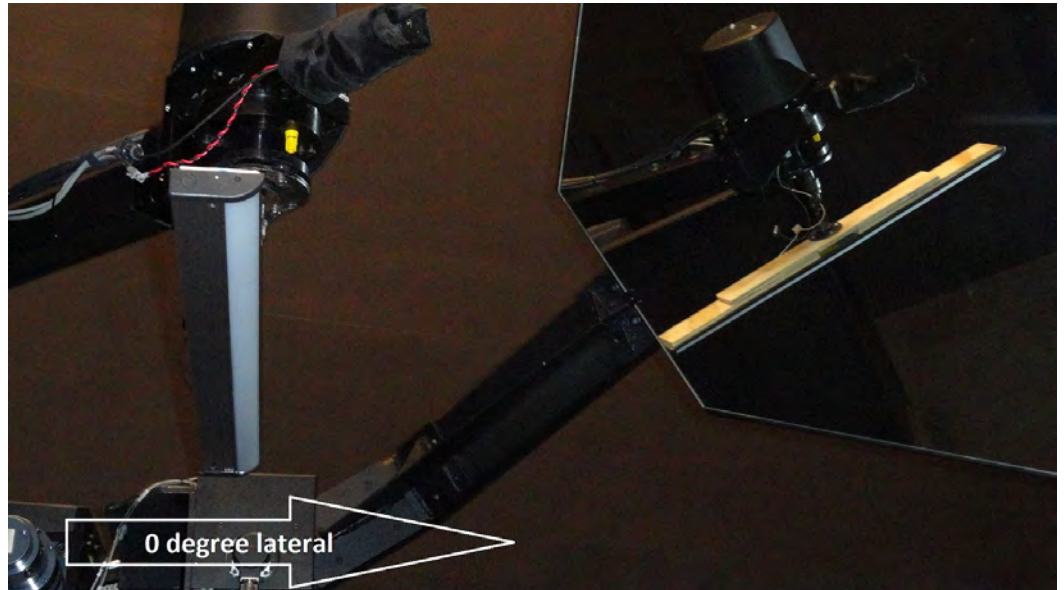
Catalog Number: P700004-020-30  
Description: 36" Linear Under-Cabinet - Bronze

### Photometry

Test Method:	IES LM-79-08 § 10
Preburn Time:	0:30
Time To Stabilize:	0:50
Total Operating Time:	92:10
Input Voltage (Volts):	120.1
Input Current (Amps):	0.177
Input Wattage (Watts):	21.1
Ambient Temp (°C):	24.1
PF @120V:	0.99
THD @120V (%):	15.42

### Sphere

Test Method:	IES LM-79-08 § 9.1 & 12.1
Preburn Time:	0:30
Time To Stabilize:	0:59
Total Operating Time:	1:29
Input Voltage (Volts):	120.0
Input Current (Amps):	0.176
Input Wattage (Watts):	20.8
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.

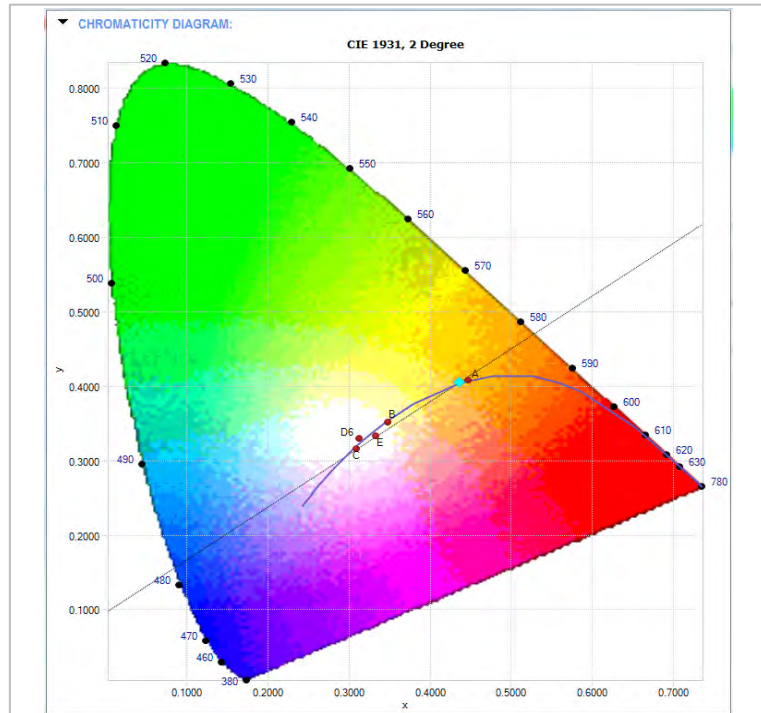


Lamp Cat#: SAW9A32E-E1  
 Lamp Desc: 84 - Seoul Semiconductor 3000K LEDs  
 Driver Desc: NA

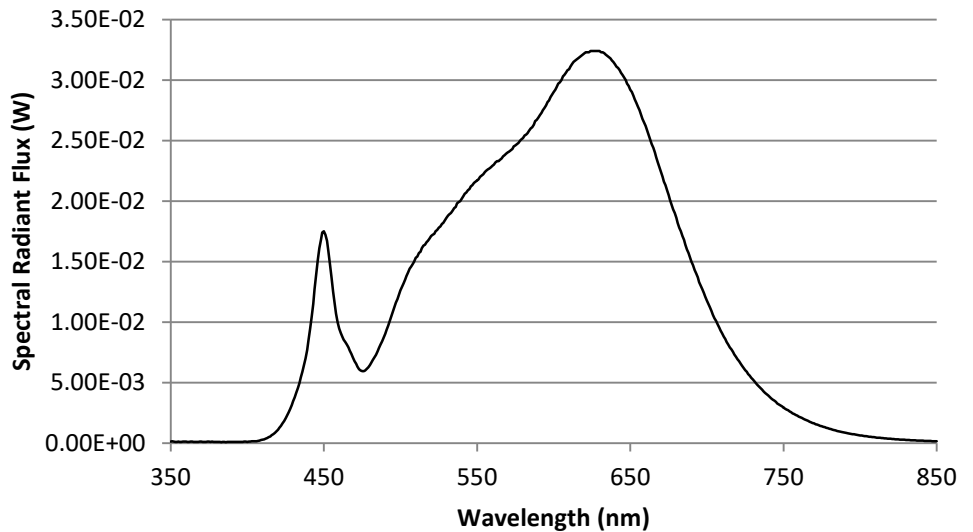
Efficacy: 78.7 LPW      S/P Ratio: 1.4 LM/LM

**Spectral Results**

Name	Value	Unit
$\Phi$	5.82	watts
$\Phi(v)$	1637	lumens
$\Phi(v')$	2313	lm'
Chrom x	0.4354	
Chrom y	0.4056	
Chrom u	0.249	
Chrom v	0.3478	
Duv	0.0007	
Chrom u'	0.249	
Chrom v'	0.5217	
CCT	3035	K
Purity	52.4	%
$\lambda$ (dom)	582.4	nm
FWHM	171.8	nm
$\lambda$ (peak)	625.1	nm
$\lambda$ (center)	600.7	nm
$\lambda$ (centroid)	596.2	nm
SDCM	Cool White	
RA	94	
Corr. Coef.	0.000820515	
Correlation	0.0054	
R1	94.1	
R2	95.1	
R3	94.7	
R4	94.7	
R5	93.4	
R6	93.6	
R7	95.0	
R8	87.6	
R9	69.8	
R10	87.7	
R11	95.2	
R12	81.3	
R13	94.2	
R14	96.3	



**Spectral Distribution of Radiant Flux**



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**PREPARED FOR:** PROGRESS

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**LUMINAIRE:** 36" Linear Under-Cabinet - Bronze

**LAMP CAT. NO.:** SAW9A32E-E1

**LAMP:** 84- Seoul Semi 3000K LEDs

**MOUNTING:** Surface

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



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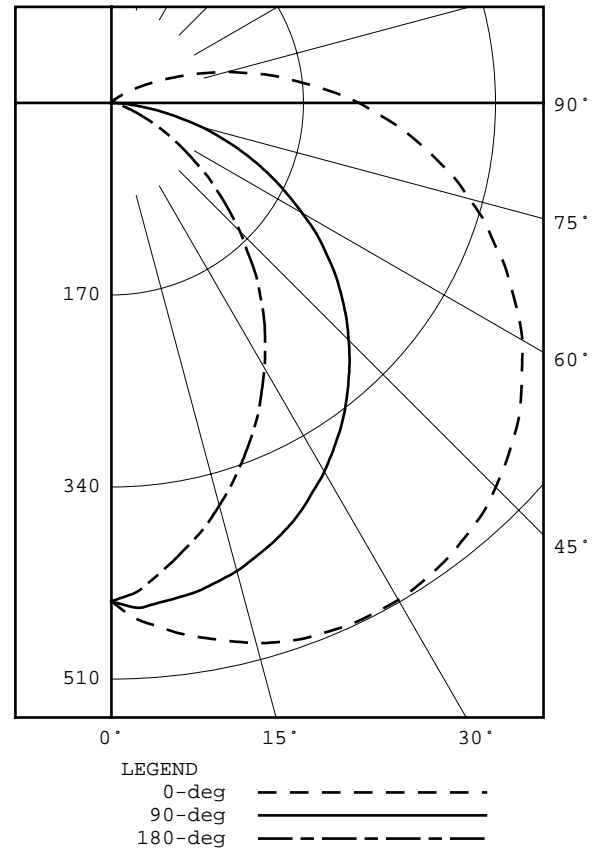
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CANDELA DISTRIBUTION						FLUX
	0.0	45.0	90.0	135.0	180.0	
0	441	441	441	441	441	
5	465	455	445	424	423	42
15	495	470	429	381	369	120
25	508	468	398	326	306	183
35	503	450	353	262	236	223
45	481	416	297	190	161	235
55	443	369	232	118	90	219
65	391	313	158	54	37	182
75	328	247	83	13	10	135
85	257	172	16	1	2	89
90	219	135	0	0	1	
95	178	100	0	0	0	51
105	106	41	0	0	0	25
115	47	11	0	0	0	9
125	16	3	0	0	0	3
135	4	1	0	0	0	1
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	345	22.8
0- 40	568	37.5
0- 60	1022	67.4
0- 90	1428	94.1
90-120	85	5.6
90-130	88	5.8
90-150	89	5.9
90-180	89	5.9
0-180	1517	100.0

EFFICACY = 71.9 lm/W  
CIE TYPE - DIRECT  
PLANE : 0-DEG 90-DEG 180-DEG  
SPACING CRITERIA : 1.69 1.27 0.96





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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	441	441	441	441	441	441	441	441	441	441	441	441	441	441
2.5	456	455	454	451	452	449	447	445	439	442	447	440	434	435
5.0	465	465	463	459	458	455	451	447	441	441	445	438	430	429
7.5	474	473	471	467	465	460	455	449	441	439	442	434	425	422
10.0	481	481	479	474	471	465	458	451	440	437	439	430	418	414
12.5	488	488	485	479	475	468	459	451	438	433	434	424	411	406
15.0	495	494	490	484	479	470	460	450	436	428	429	418	404	396
17.5	500	499	495	488	481	472	460	447	432	423	422	410	395	386
20.0	504	503	499	490	483	472	458	444	427	416	415	402	385	375
22.5	506	505	500	492	483	471	456	440	421	408	407	393	375	363
25.0	508	506	502	492	482	468	452	435	415	400	398	383	364	351
27.5	508	507	502	492	480	465	448	430	407	390	387	372	352	337
30.0	508	507	501	490	477	461	442	422	399	381	377	360	340	325
32.5	506	505	499	487	473	456	436	414	390	370	365	349	326	309
35.0	503	502	496	483	468	450	428	405	380	358	353	336	312	294
37.5	499	498	492	479	462	442	420	396	369	345	340	322	298	279
40.0	494	493	486	471	455	433	411	385	357	332	326	307	282	262
42.5	489	487	480	465	447	425	400	374	345	318	312	292	267	245
45.0	481	480	473	457	438	416	390	362	332	304	297	278	251	228
47.5	473	472	464	448	428	405	378	349	318	289	282	261	233	210
50.0	464	463	455	439	418	394	366	336	304	274	266	245	218	192
52.5	455	453	446	428	407	383	353	322	290	258	250	228	200	174
55.0	443	442	434	417	395	369	339	308	274	243	232	210	181	156
57.5	431	430	422	405	382	356	325	292	258	225	215	193	162	137
60.0	420	419	410	392	369	342	311	278	243	209	195	175	146	119
62.5	406	404	396	378	353	326	295	260	226	190	176	157	126	101
65.0	391	390	381	365	340	313	280	243	209	172	158	139	107	83
67.5	377	376	367	350	325	295	264	228	190	154	139	120	90	67
70.0	360	359	350	335	310	280	246	209	172	135	120	102	72	51
72.5	346	345	336	318	293	262	230	192	153	118	101	84	55	36
75.0	328	327	318	302	276	247	211	173	135	99	83	66	38	23
77.5	312	311	300	284	259	228	192	155	117	80	63	47	25	14
80.0	293	292	283	265	240	209	174	137	99	62	46	31	14	7
82.5	275	273	264	249	223	191	156	118	81	44	30	18	5	3
85.0	257	256	247	229	203	172	138	100	62	29	16	7	2	1
87.5	237	236	227	210	184	154	120	82	46	15	5	1	0	0
90.0	219	218	209	190	166	135	101	66	31	5	0	0	0	0
92.5	199	198	188	171	146	116	84	49	18	1	0	0	0	0
95.0	178	177	168	152	128	100	67	35	10	0	0	0	0	0
97.5	159	157	149	134	111	83	52	23	5	0	0	0	0	0
100.0	142	140	132	116	94	67	39	15	2	0	0	0	0	0
102.5	122	121	113	99	78	54	28	9	1	0	0	0	0	0
105.0	106	104	97	82	63	41	20	6	1	0	0	0	0	0
107.5	88	86	80	67	50	31	14	3	0	0	0	0	0	0
110.0	73	72	66	54	38	22	10	2	0	0	0	0	0	0
112.5	58	57	52	42	29	16	6	1	0	0	0	0	0	0
115.0	47	46	41	32	22	11	4	1	0	0	0	0	0	0
117.5	36	35	32	25	16	8	3	1	0	0	0	0	0	0
120.0	28	27	24	18	12	6	2	1	0	0	0	0	0	0
122.5	21	20	18	14	9	4	2	1	0	0	0	0	0	0
125.0	16	15	13	10	6	3	1	1	0	0	0	0	0	0
127.5	11	11	10	7	4	2	1	1	0	0	0	0	0	0
130.0	8	8	7	5	3	2	1	1	0	0	0	0	0	0
132.5	6	6	5	4	2	1	1	0	0	0	0	0	0	0
135.0	4	4	4	3	2	1	1	0	0	0	0	0	0	0
137.5	3	3	3	2	1	1	1	0	0	0	0	0	0	0
140.0	2	2	2	1	1	1	0	0	0	0	0	0	0	0
142.5	2	2	2	1	1	1	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	1	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	1	1	1	1	0	0	0	0	0	0	0	0	0	0
152.5	1	1	1	1	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	441	441	441	441	441	441	441
2.5	434	433	432	431	433	434	435
5.0	426	424	422	420	421	422	423
7.5	418	415	412	408	409	410	410
10.0	409	404	400	396	396	397	397
12.5	399	393	387	383	383	383	384
15.0	388	381	374	370	368	368	369
17.5	377	368	361	355	354	353	354
20.0	364	355	347	340	338	337	338
22.5	351	341	332	325	322	321	322
25.0	338	326	317	309	306	305	306
27.5	323	312	301	292	289	288	288
30.0	308	295	285	275	271	271	271
32.5	293	278	268	259	255	253	253
35.0	278	262	250	241	237	235	236
37.5	260	245	232	223	218	216	217
40.0	244	227	214	206	201	198	199
42.5	226	210	197	185	180	179	178
45.0	210	190	177	168	163	160	161
47.5	190	172	159	149	145	142	142
50.0	171	155	142	132	127	124	124
52.5	154	136	123	115	111	108	108
55.0	134	118	106	99	92	91	90
57.5	117	100	89	82	78	75	75
60.0	99	84	74	66	63	61	61
62.5	83	68	58	53	51	49	49
65.0	66	54	46	41	39	37	37
67.5	50	40	34	31	28	28	27
70.0	37	29	24	22	21	20	20
72.5	25	20	17	16	15	15	14
75.0	16	13	11	10	10	10	10
77.5	10	8	7	7	7	7	7
80.0	5	5	4	5	5	5	5
82.5	3	3	3	3	3	3	3
85.0	1	1	2	2	2	2	2
87.5	0	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		11
5- 10		31
10- 15		51
15- 20		69
20- 25		85
25- 30		98
30- 35	108	
35- 40	115	
40- 45	118	
45- 50	117	
50- 55	113	
55- 60	106	
60- 65	97	
65- 70	85	
70- 75	73	
75- 80	61	
80- 85	50	
85- 90	39	
90- 95	30	
95-100	22	
100-105	15	
105-110	10	
110-115	6	
115-120	3	
120-125	2	
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		42
10- 20		120
20- 30		183
30- 40		223
40- 50		235
50- 60		219
60- 70		182
70- 80		135
80- 90		89
90-100		51
100-110		25
110-120		9
120-130		3
130-140		1
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	118	118	118	118	114	114	114	114	108	108	108	102	102	102	97	97	97	94
1	105	100	95	90	102	97	92	88	91	88	84	86	83	81	82	79	77	75
2	95	86	78	72	92	84	77	71	79	73	68	75	70	66	71	67	63	61
3	86	75	66	59	83	73	65	58	69	62	56	65	60	55	62	57	53	50
4	79	66	57	50	76	64	56	49	61	54	48	58	52	46	55	50	45	43
5	72	59	49	43	70	57	49	42	55	47	41	52	45	40	49	44	39	37
6	67	53	44	37	64	52	43	37	49	41	36	47	40	35	45	39	34	32
7	62	48	39	32	60	47	38	32	45	37	32	43	36	31	41	35	30	28
8	58	44	35	29	56	43	34	29	41	33	28	39	32	28	37	31	27	25
9	54	40	32	26	52	39	31	26	38	30	25	36	29	25	35	29	24	22
10	50	37	29	23	49	36	28	23	35	28	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  
9/5/2017

### *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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