

Project Number  
17.02411



Date  
8/31/2017

LAB #6  
Sphere

**Test Sample Description**

Catalog Number: P700000-028-30  
Description: 9" Linear Under-Cabinet. White

**Photometry**

Test Method: IES LM-79-08 § 10  
Preburn Time: 15:45  
Time To Stabilize: 0:35  
Total Operating Time: 18:25  
  
Input Voltage (Volts): 120.2  
Input Current (Amps): 0.040  
Input Wattage (Watts): 4.7  
Ambient Temp (°C): 24.2  
PF @120V: 0.99  
THD @120V (%): 13.23

**Sphere**

Test Method: IES LM-79-08 § 9.1 & 12.1  
Preburn Time: 2:00  
Time To Stabilize: 1:12  
Total Operating Time: 3:12  
  
Input Voltage (Volts): 120.0  
Input Current (Amps): 0.039  
Input Wattage (Watts): 4.7  
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



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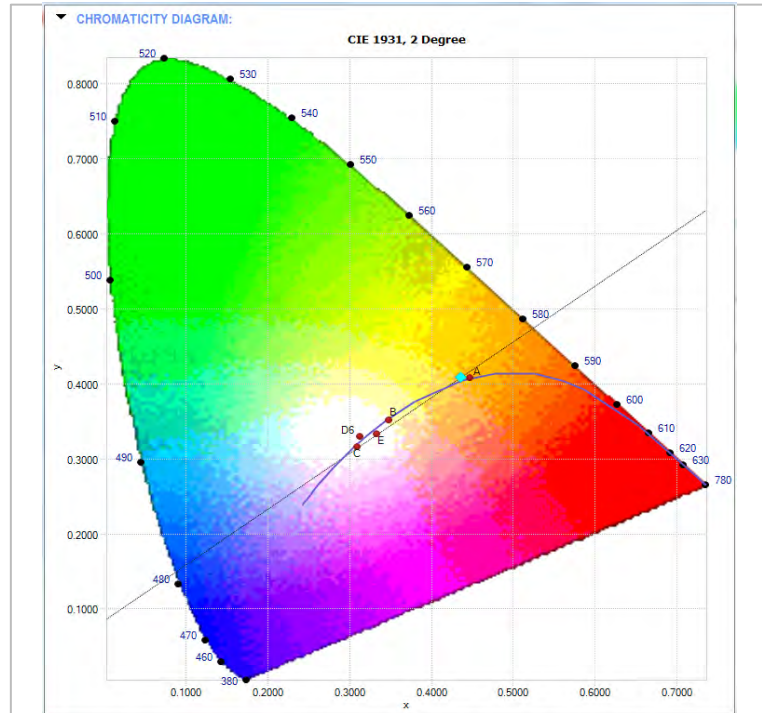


Lamp Cat#: SAW9A32E-E1  
 Lamp Desc: 16 - Seoul Semiconductor 3000K LEDs  
 Driver Desc: NA

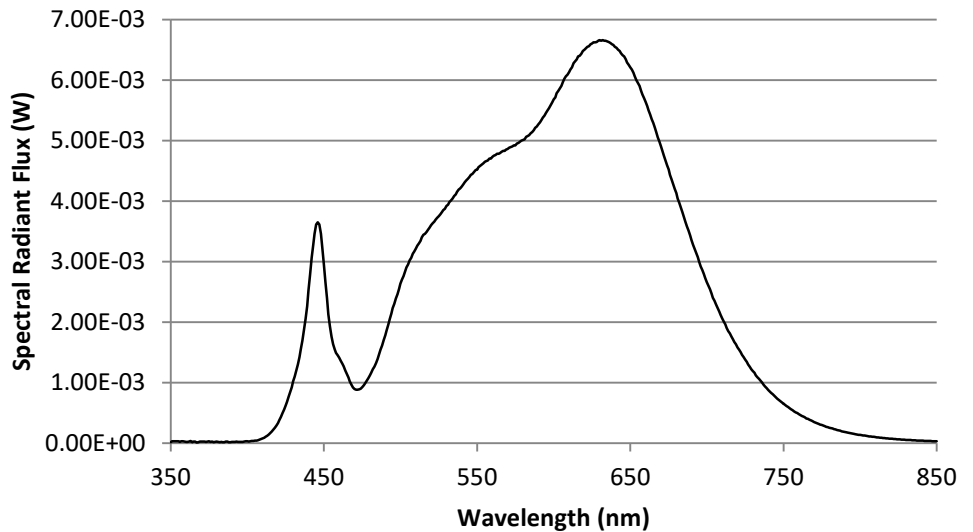
Efficacy: 71.1 LPW      S/P Ratio: 1.4 LM/LM

**Spectral Results**

Name	Value	Unit
Φ	1.21	watts
Φ(v)	334	lumens
Φ(v')	467	lm'
Chrom x	0.4359	
Chrom y	0.4095	
Chrom u	0.2476	
Chrom v	0.3489	
Duv	0.0023	
Chrom u'	0.2476	
Chrom v'	0.5233	
CCT	3059	K
Purity	53.7	%
λ (dom)	581.8	nm
FWHM	177.6	nm
λ (peak)	631.6	nm
λ (center)	601.5	nm
λ (centroid)	598.2	nm
SDCM	Cool White	
RA	93	
Corr. Coef.	0.002294493	
Correlation	0.0054	
R1	94.8	
R2	93.6	
R3	91.1	
R4	94.3	
R5	93.5	
R6	91.4	
R7	94.6	
R8	91.5	
R9	77.4	
R10	84.4	
R11	95.2	
R12	80.7	
R13	94.1	
R14	94.3	



**Spectral Distribution of Radiant Flux**



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**LUMINAIRE:** 9" Linear Under-Cabinet. White

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

**LAMP:** 16- Seoul 3000K LEDs

**MOUNTING:** Surface

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



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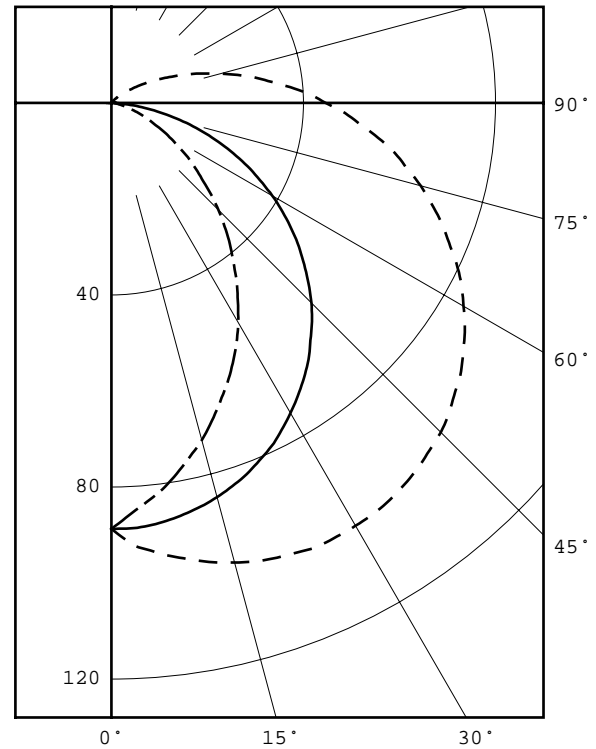
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CANDELA DISTRIBUTION						FLUX
	0.0	45.0	90.0	135.0	180.0	
0	89	89	89	89	89	
5	94	92	88	85	84	8
15	99	94	85	76	73	24
25	102	94	79	65	60	37
35	101	91	70	52	46	45
45	97	84	59	38	32	47
55	90	75	46	24	19	44
65	79	64	31	12	9	37
75	67	50	16	4	3	28
85	52	36	3	1	1	19
90	45	29	0	0	0	
95	37	22	0	0	0	11
105	24	11	0	0	0	6
115	12	4	0	0	0	3
125	5	1	0	0	0	1
135	1	1	0	0	0	0
145	1	0	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	69	22.3
0- 40	114	36.7
0- 60	206	66.3
0- 90	289	93.3
90-120	20	6.3
90-130	20	6.6
90-150	21	6.7
90-180	21	6.7
0-180	310	100.0

EFFICACY = 66.0 lm/W  
CIE TYPE - DIRECT  
PLANE : 0-DEG 90-DEG 180-DEG  
SPACING CRITERIA : 1.69 1.25 0.94



LEGEND  
0-deg - - - - -  
90-deg - - - - -  
180-deg - . - . - .



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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	89	89	89	89	89	89	89	89	89	89	89	89	89	89
2.5	92	92	91	91	91	90	90	90	90	89	89	89	88	88
5.0	94	93	93	93	92	92	91	90	90	89	88	88	87	87
7.5	95	95	95	94	93	93	92	91	90	89	88	87	86	85
10.0	97	97	96	95	94	93	92	91	90	88	87	86	85	84
12.5	98	98	97	96	95	94	92	91	89	87	86	85	84	82
15.0	99	99	98	97	96	94	93	91	89	86	85	84	82	80
17.5	100	100	99	98	97	95	92	90	88	85	84	82	80	78
20.0	101	101	100	99	97	95	92	90	87	84	82	81	78	76
22.5	101	101	100	99	97	94	92	89	86	83	81	79	76	73
25.0	102	102	101	99	97	94	91	88	85	81	79	77	74	71
27.5	102	102	101	99	97	94	90	87	83	79	77	75	71	68
30.0	102	102	101	99	96	93	89	85	81	77	75	72	69	65
32.5	102	101	100	98	95	92	88	84	79	75	72	70	66	62
35.0	101	101	99	97	94	91	86	82	77	72	70	68	63	59
37.5	100	100	99	96	93	89	85	80	75	70	67	65	60	56
40.0	99	99	98	95	92	88	83	78	73	67	65	62	57	53
42.5	98	98	97	94	90	86	81	76	70	65	62	59	54	49
45.0	97	97	95	93	89	84	79	73	68	62	59	56	51	46
47.5	95	95	94	91	87	82	77	71	65	59	56	53	47	42
50.0	94	93	92	89	85	80	74	68	62	56	52	49	44	38
52.5	92	92	90	87	83	77	72	65	59	52	49	46	40	35
55.0	90	89	88	85	80	75	69	63	56	49	46	42	37	31
57.5	87	87	85	82	78	72	66	60	53	46	42	39	33	28
60.0	85	85	83	80	75	69	63	57	50	42	39	35	29	24
62.5	82	82	80	77	72	67	60	53	46	39	35	31	25	20
65.0	79	79	78	74	69	64	57	50	42	35	31	28	21	17
67.5	76	76	74	71	66	60	54	47	39	31	28	24	18	14
70.0	73	73	72	68	63	57	51	43	35	28	24	20	14	11
72.5	70	70	68	65	60	54	47	39	32	24	20	16	11	8
75.0	67	67	65	61	57	50	44	36	28	20	16	13	8	6
77.5	63	63	61	58	53	47	40	32	24	16	13	9	5	4
80.0	60	60	58	54	50	43	36	28	20	12	9	6	3	2
82.5	56	56	54	51	46	40	33	25	16	9	6	4	2	1
85.0	52	52	50	47	42	36	29	21	13	6	3	1	1	1
87.5	49	49	47	43	39	32	25	18	10	3	1	0	0	0
90.0	45	45	43	40	35	29	22	14	7	1	0	0	0	0
92.5	41	41	39	36	31	25	18	11	4	0	0	0	0	0
95.0	37	37	36	32	28	22	15	8	3	0	0	0	0	0
97.5	34	34	32	29	24	18	12	6	2	0	0	0	0	0
100.0	30	30	28	26	21	16	10	4	1	0	0	0	0	0
102.5	27	27	25	22	18	13	8	3	1	0	0	0	0	0
105.0	24	23	22	19	15	11	6	2	0	0	0	0	0	0
107.5	20	20	19	16	13	8	4	1	0	0	0	0	0	0
110.0	18	17	16	14	10	7	3	1	0	0	0	0	0	0
112.5	15	15	14	11	8	5	2	1	0	0	0	0	0	0
115.0	12	12	11	9	7	4	2	1	0	0	0	0	0	0
117.5	10	10	9	7	5	3	1	0	0	0	0	0	0	0
120.0	8	8	7	6	4	2	1	0	0	0	0	0	0	0
122.5	7	6	6	4	3	2	1	0	0	0	0	0	0	0
125.0	5	5	4	3	2	1	1	0	0	0	0	0	0	0
127.5	4	4	3	2	2	1	0	0	0	0	0	0	0	0
130.0	3	3	3	2	1	1	0	0	0	0	0	0	0	0
132.5	2	2	2	1	1	0	0	0	0	0	0	0	0	0
135.0	1	1	1	1	1	1	0	0	0	0	0	0	0	0
137.5	1	1	1	1	1	0	0	0	0	0	0	0	0	0
140.0	1	1	1	1	0	0	0	0	0	0	0	0	0	0
142.5	1	1	1	0	0	0	0	0	0	0	0	0	0	0
145.0	1	0	0	0	0	0	0	0	0	0	0	0	0	0
147.5	0	0	0	0	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	89	89	89	89	89	89	89
2.5	87	87	87	86	86	86	86
5.0	86	85	85	84	84	83	84
7.5	84	83	82	82	81	81	81
10.0	82	81	80	79	79	78	78
12.5	80	79	78	77	76	76	76
15.0	78	76	75	74	73	73	73
17.5	75	74	72	71	70	70	70
20.0	73	71	69	68	67	67	66
22.5	70	68	66	65	64	63	63
25.0	68	65	63	62	60	60	60
27.5	65	62	60	58	57	56	56
30.0	62	59	56	55	54	53	53
32.5	58	55	53	51	50	49	49
35.0	55	52	50	48	46	46	46
37.5	52	49	46	44	43	42	42
40.0	49	45	42	40	39	39	38
42.5	45	42	39	37	36	35	35
45.0	41	38	35	33	32	32	32
47.5	38	34	32	30	29	28	28
50.0	34	31	28	27	25	25	25
52.5	30	27	25	23	22	22	22
55.0	27	24	22	20	19	19	19
57.5	23	20	19	17	16	16	16
60.0	20	18	16	15	14	14	14
62.5	17	14	13	12	11	11	11
65.0	14	12	11	10	9	9	9
67.5	11	9	8	8	7	7	7
70.0	8	7	6	6	6	6	6
72.5	6	5	5	4	4	4	4
75.0	4	4	4	3	3	3	3
77.5	3	2	2	2	2	2	2
80.0	2	2	2	2	2	2	2
82.5	1	1	1	1	1	1	1
85.0	1	1	1	1	1	1	1
87.5	0	1	1	1	1	1	1
90.0	0	0	0	0	0	0	0
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		2
5- 10		6
10- 15		10
15- 20		14
20- 25		17
25- 30		20
30- 35		22
35- 40		23
40- 45		24
45- 50		24
50- 55		23
55- 60		22
60- 65		20
65- 70		18
70- 75		15
75- 80		13
80- 85		10
85- 90		8
90- 95		6
95-100		5
100-105		3
105-110		2
110-115		2
115-120		1
120-125		1
125-130		0
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		8
10- 20		24
20- 30		37
30- 40		45
40- 50		47
50- 60		44
60- 70		37
70- 80		28
80- 90		19
90-100		11
100-110		6
110-120		3
120-130		1
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	68	62	56	65	59	54	61	56	52	50
4	79	66	56	49	76	64	55	49	61	53	47	57	51	46	54	49	44	42
5	72	59	49	42	69	57	48	42	54	46	41	51	45	39	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**  
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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.*