

Project Number  
17.01347



**HUBBELL**  
Lighting

Date  
5/10/2017

Lab 6  
Sphere

### Test Sample Description

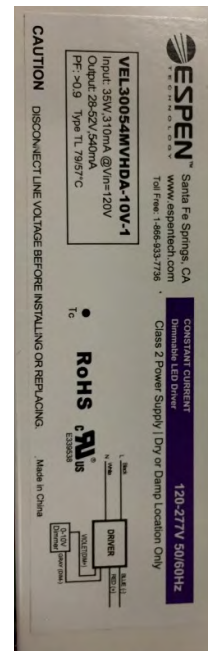
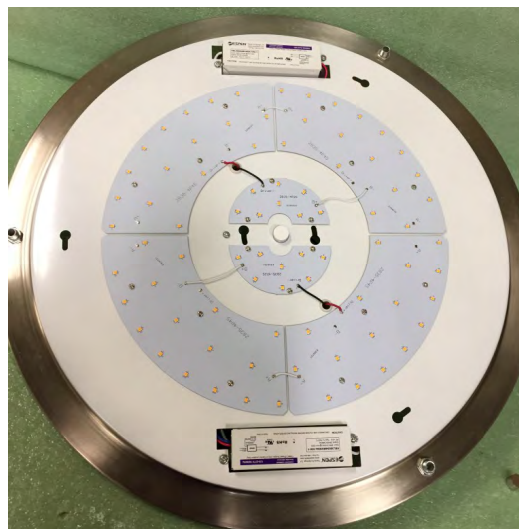
Catalog Number: P350071-009-30  
Description: 21" Round LED Flush-Mount

### Photometry

Test Method: IES LM-79-08 § 10  
Preburn Time: 0:30  
Time To Stabilize: 0:43  
Total Operating Time: 1:45  
  
Input Voltage (Volts): 120.0  
Input Current (Amps): 0.343  
Input Wattage (Watts): 41.0  
Ambient Temp (°C): 24.2

### Sphere

Test Method: IES LM-79-08 § 9.1 & 12.1  
Preburn Time: 8:00  
Time To Stabilize: 1:02  
Total Operating Time: 9:02  
  
Input Voltage (Volts): 120.0  
Input Current (Amps): 0.344  
Input Wattage (Watts): 40.9  
Ambient Temp (°C): 24.5



### 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.

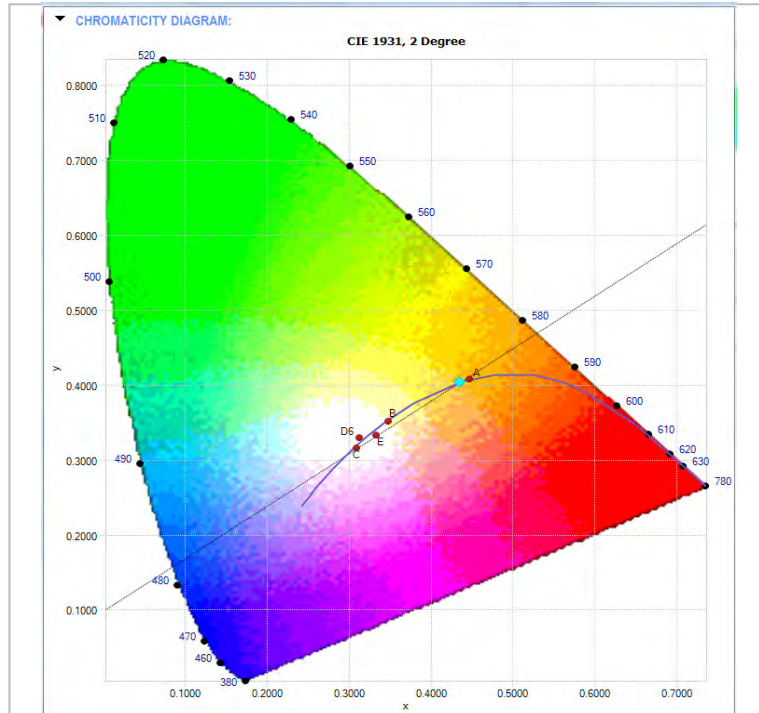


Lamp Cat#: LM281B  
 Lamp Desc: 96 - Samsung 3000K LEDs  
 Driver Desc: 2 - Espen VEL30054MVHDA-10V-1

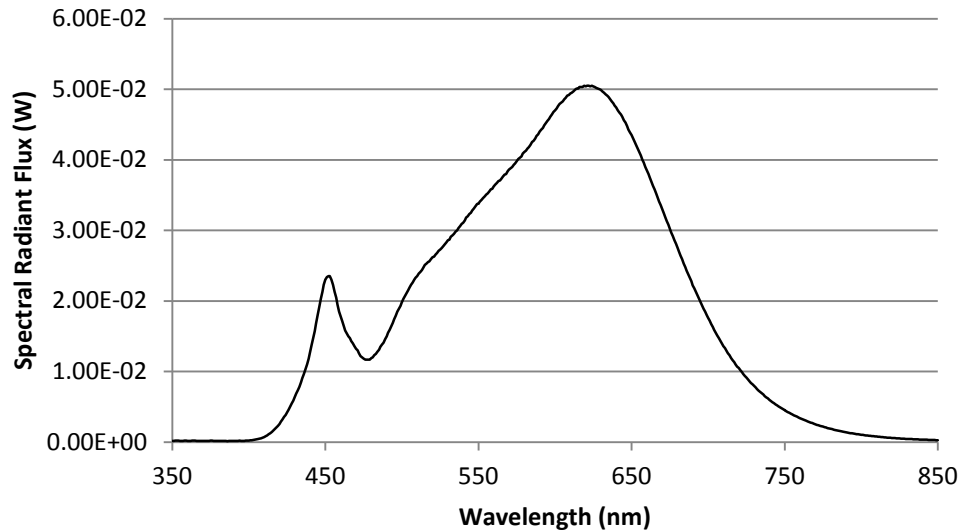
Efficacy: 63.3 LPW      S/P Ratio: 1.4 LM'/LM

**Spectral Results**

Name	Value	Unit
$\Phi$	9.09	watts
$\Phi(v)$	2588	lumens
$\Phi(v')$	3672	lm'
Chrom x	0.4348	
Chrom y	0.4044	
Chrom u	0.249	
Chrom v	0.3475	
Duv	0.0004	
Chrom u'	0.249	
Chrom v'	0.5212	
CCT	3037	K
Purity	51.9	%
$\lambda$ (dom)	582.5	nm
FWHM	168.3	nm
$\lambda$ (peak)	622.4	nm
$\lambda$ (center)	600.1	nm
$\lambda$ (centroid)	594.5	nm
SDCM	Cool White	
RA	92	
Corr. Coef.	0.000466861	
Correlation	0.0054	
R1	92.2	
R2	95.3	
R3	97.2	
R4	92.6	
R5	91.8	
R6	94.1	
R7	92.9	
R8	82.7	
R9	60.1	
R10	88.3	
R11	92.9	
R12	82.6	
R13	92.9	
R14	97.9	



**Spectral Distribution of Radiant Flux**



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**ISSUE DATE:** 05/09/17

**PREPARED FOR:** PROGRESS

**CATALOG NUMBER:** P350071-009-30

**LUMINAIRE:** 21" Round LED Flush-Mount

**LAMP CAT. NO.:** LM281B

**LAMP:** 96- 3000K Samsung LEDs

**BALLAST CATALOG NUMBER:** VEL30054MVHDA-10V-1

**BALLAST:** 2- Espen

**REFRACTOR:** Etched Glass

**MOUNTING:** Ceiling

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

**PAGE:** 3 OF 9



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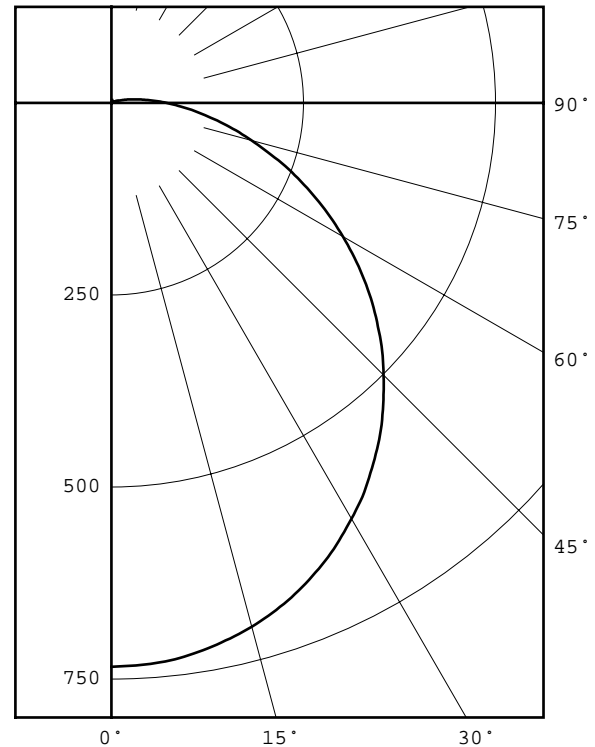
**REPORT NUMBER:** 17.01347  
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**CATALOG NUMBER:** P350071-009-30

**PAGE:** 4 OF 9

DEG	CANDELA	LUMENS
0	734	
5	731	69
15	706	199
25	658	303
35	588	368
45	501	387
55	402	359
65	294	291
75	189	201
85	105	115
90	72	
95	45	51
105	14	16
115	5	5
125	3	3
135	3	2
145	3	2
155	3	1
165	3	1
175	4	0
180	4	

ZONAL LUMEN ZONE	SUMMARY LUMENS	%FIXT
0- 30	572	24.1
0- 40	940	39.6
0- 60	1686	71.0
0- 90	2293	96.5
90-120	73	3.1
90-130	75	3.2
90-150	80	3.3
90-180	82	3.5
0-180	2376	100.0

EFFICACY = 58.0 lm/W  
CIE TYPE - DIRECT  
LUMINAIRE SPACING CRITERION = 1.27





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**PAGE:** 5 OF 9

LUMINOUS DIAMETER: 18.000  
HEIGHT OF SIDE : 2.750

LUMINANCE DATA IN CANDELA/SQ M  
ANGLE AVERAGE  
IN DEG

45	3613.
55	3341.
65	2990.
75	2577.
85	2277.



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**PAGE:** 6 OF 9

CANDELA DISTRIBUTION

0.0	734
5.0	731
10.0	721
15.0	706
20.0	685
25.0	658
30.0	625
35.0	588
40.0	547
45.0	501
50.0	453
55.0	402
60.0	348
65.0	294
70.0	241
75.0	189
80.0	144
85.0	105
90.0	72
95.0	45
100.0	26
105.0	14
110.0	8
115.0	5
120.0	4
125.0	3
130.0	3
135.0	3
140.0	3
145.0	3
150.0	3
155.0	3
160.0	3
165.0	3
170.0	4
175.0	4
180.0	4



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**PAGE:** 7 OF 9

5-DEGREE ZONAL LUMEN SUMMARY		
0- 5		18
5- 10		52
10- 15		85
15- 20		115
20- 25		141
25- 30		162
30- 35		179
35- 40		189
40- 45		194
45- 50		193
50- 55		186
55- 60		173
60- 65		156
65- 70		135
70- 75		112
75- 80		89
80- 85		67
85- 90		48
90- 95		32
95-100		19
100-105		11
105-110		5
110-115		3
115-120		2
120-125		2
125-130		1
130-135		1
135-140		1
140-145		1
145-150		1
150-155		1
155-160		1
160-165		0
165-170		0
170-175		0
175-180		0

10-DEGREE ZONAL LUMEN SUMMARY		
0- 10		69
10- 20		199
20- 30		303
30- 40		368
40- 50		387
50- 60		359
60- 70		291
70- 80		201
80- 90		115
90-100		51
100-110		16
110-120		5
120-130		3
130-140		2
140-150		2
150-160		1
160-170		1
170-180		0



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**PAGE:** 8 OF 9

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	118	115	115	115	115	109	109	109	104	104	104	99	99	99	97
1	106	101	96	92	92	103	98	94	90	93	90	86	89	86	83	85	82	80	78
2	96	87	80	74	74	93	85	78	72	81	75	70	77	72	68	73	70	66	64
3	87	76	68	61	61	85	74	66	60	71	64	58	68	62	57	64	60	55	53
4	80	67	58	51	51	77	66	57	50	63	55	49	60	54	48	57	52	47	45
5	73	60	51	44	44	71	59	50	43	56	48	42	54	47	42	51	46	41	39
6	68	54	45	38	38	65	53	44	38	51	43	37	48	42	36	47	41	36	34
7	63	49	40	33	33	61	48	39	33	46	38	33	44	37	32	42	36	32	30
8	58	44	36	30	30	57	44	35	30	42	34	29	40	34	29	39	33	28	26
9	54	41	32	27	27	53	40	32	27	39	31	26	37	31	26	36	30	26	24
10	51	38	30	24	24	50	37	29	24	36	29	24	35	28	23	33	27	23	21

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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5/10/2017

### *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:* 09/02/2016

<i>Test Equipment Used</i>			
<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

<i>Test Equipment Used - Color &amp; SPD; THD &amp; Power Factor</i>			
<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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