

Project Number  
17.01797



Date  
6/27/2017

Lab 6  
Sphere

**Test Sample Description**

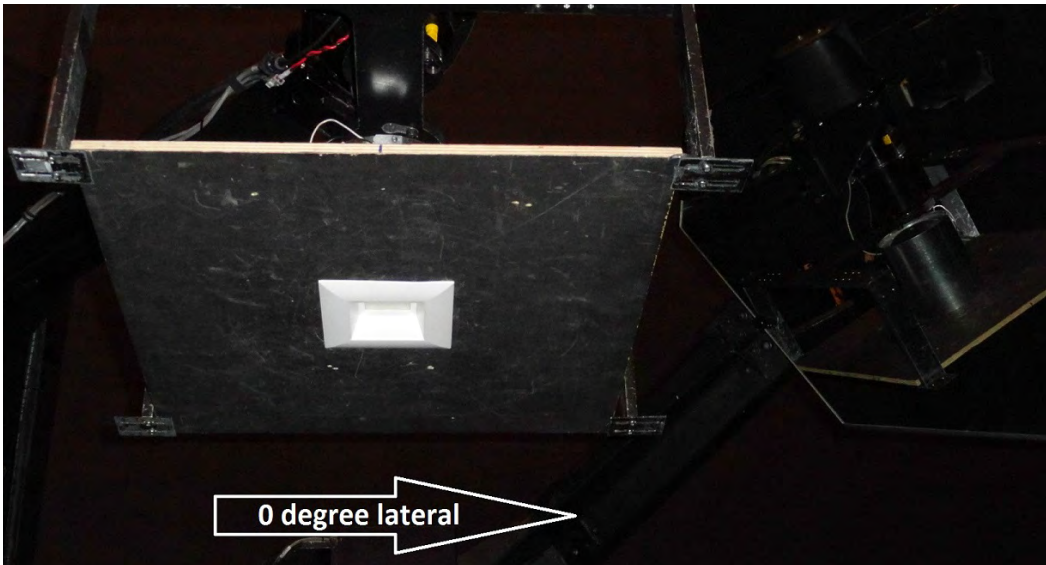
Catalog Number: P8161-28-30K  
Description: HAL 5" square recessed white GT LED with new inductors.

**Photometry**

Test Method: IES LM-79-08 § 10  
Preburn Time: 18:35  
Time To Stabilize: 1:10  
Total Operating Time: 20:20  
  
Input Voltage (Volts): 120.1  
Input Current (Amps): 0.077  
Input Wattage (Watts): 9.1  
Ambient Temp (°C): 24.0

**Sphere**

Test Method: IES LM-79-08 § 9.1 & 12.1  
Preburn Time: 2:00  
Time To Stabilize: 1:08  
Total Operating Time: 3:08  
  
Input Voltage (Volts): 120.0  
Input Current (Amps): 0.077  
Input Wattage (Watts): 9.0  
Ambient Temp (°C): 24.3



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Checked (sphere): B.LEE  
Checked (photometry): M. ELLMANN  
Approved: D. BLACK



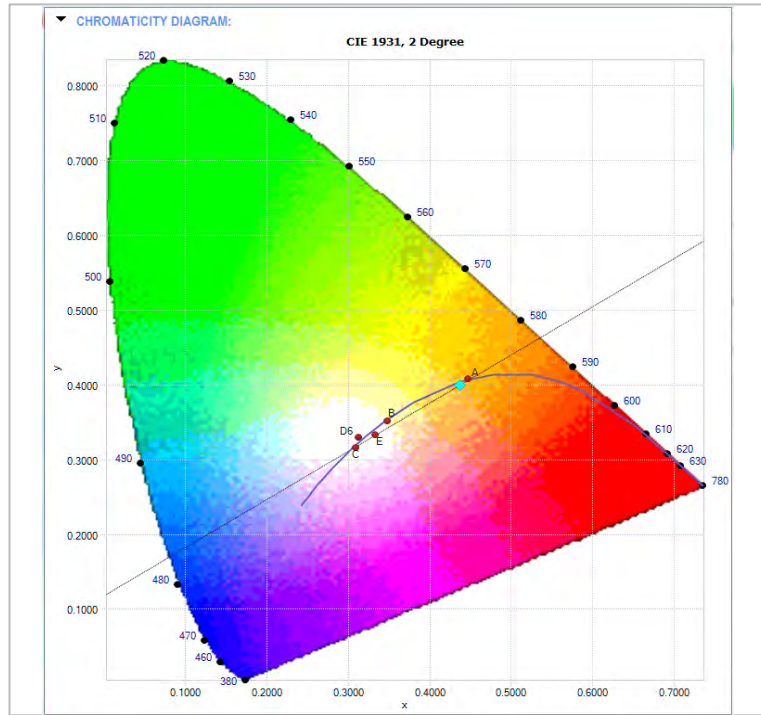


Lamp Cat#: GT-V1  
 Lamp Desc: 16 - Nichia 3000K LEDs  
 Driver Desc: 1 - HAL - (hubbell China) 93081773

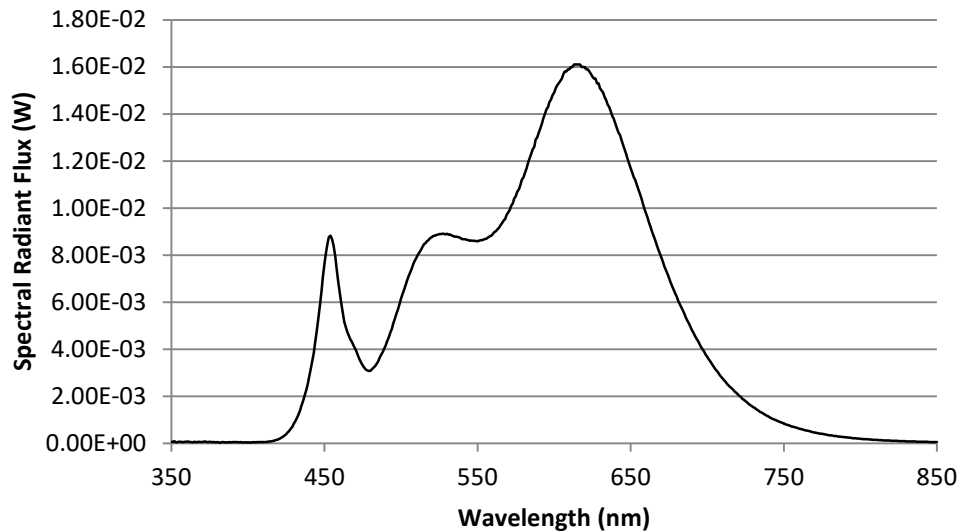
Efficacy: 83.0 LPW      S/P Ratio: 1.5 LM/LM

**Spectral Results**

Name	Value	Unit
$\Phi$	2.52	watts
$\Phi(v)$	747	lumens
$\Phi(v')$	1094	lm'
Chrom x	0.437	
Chrom y	0.4001	
Chrom u	0.2524	
Chrom v	0.3466	
Duv	0.0018	
Chrom u'	0.2524	
Chrom v'	0.5198	
CCT	2964	K
Purity	51.3	%
$\lambda$ (dom)	583.6	nm
FWHM	157.9	nm
$\lambda$ (peak)	614.7	nm
$\lambda$ (center)	590.3	nm
$\lambda$ (centroid)	589.1	nm
SDCM	Cool White	
RA	95	
Corr. Coef.	0.00159894	
Correlation	0.0054	
R1	98.5	
R2	98.9	
R3	97.1	
R4	98.4	
R5	99.5	
R6	93.4	
R7	90.6	
R8	81.9	
R9	60.4	
R10	98.2	
R11	92.3	
R12	87.5	
R13	99.2	
R14	99.0	



**Spectral Distribution of Radiant Flux**



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



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**ISSUE DATE:** 06/28/17

**PREPARED FOR:** PROGRESS

**CATALOG NUMBER:** P8161-28-30K

**LUMINAIRE:** HAL 5" square recessed white GT LED with new inductors.

**LAMP CAT. NO.:** GT-V1

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

**BALLAST CATALOG NUMBER:** 93081773

**BALLAST:** 1 - HAL - (Hubbell China)

**REFRACTOR:** 93070948-1065 PC

**MOUNTING:** Recessed

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



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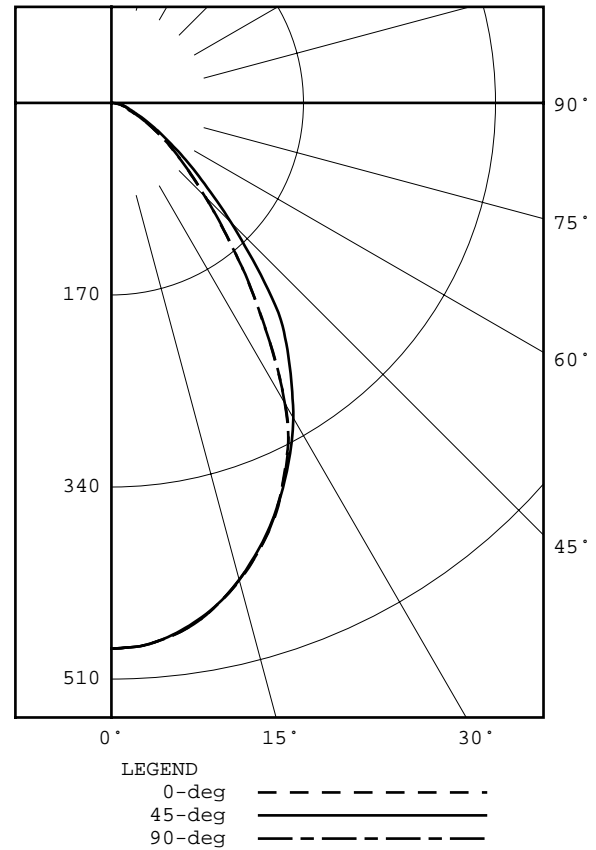
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CANDELA DISTRIBUTION						FLUX
	0.0	22.5	45.0	67.5	90.0	
0	483	483	483	483	483	
5	478	478	478	478	478	45
15	438	437	437	437	437	123
25	362	364	365	364	363	167
35	232	248	273	248	231	156
45	118	129	150	129	117	103
55	58	64	67	64	58	57
65	23	26	28	26	23	27
75	12	13	12	13	12	13
85	3	3	3	3	3	4
90	0	0	0	0	0	

ZONAL LUMEN SUMMARY		
ZONE	LUMENS	%FIXT
0- 30	334	48.2
0- 40	490	70.6
0- 60	651	93.8
0- 90	694	100.0
90-180	0	0.0
0-180	694	100.0

EFFICACY = 76.7 lm/W  
CIE TYPE - DIRECT  
PLANE : 0-DEG 90-DEG  
SPACING CRITERIA : 1.02 1.02  
LUMINOUS LENGTH : 3.250 3.250

LUMINANCE DATA IN CANDELA/SQ M			
ANGLE IN DEG	AVERAGE 0-DEG	AVERAGE 45-DEG	AVERAGE 90-DEG
45	24489.	31129.	24281.
55	14839.	17142.	14839.
65	7986.	9722.	7986.
75	6804.	6804.	6804.
85	5051.	5051.	5051.





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CANDELA DISTRIBUTION  
LATERAL ANGLE

	0.0	22.5	45.0	67.5	90.0
0.0	483	483	483	483	483
2.5	482	482	482	482	482
5.0	478	478	478	478	478
7.5	472	472	471	471	472
10.0	463	462	462	462	463
12.5	451	451	451	451	451
15.0	438	437	437	437	437
17.5	422	421	421	421	422
20.0	405	405	404	404	405
22.5	386	385	385	385	385
25.0	362	364	365	364	363
27.5	339	340	344	340	339
30.0	308	316	322	316	307
32.5	269	283	297	285	270
35.0	232	248	273	248	231
37.5	198	215	249	215	199
40.0	167	181	216	181	166
42.5	139	153	180	154	141
45.0	118	129	150	129	117
47.5	98	109	123	110	99
50.0	83	92	101	92	83
52.5	70	77	83	76	69
55.0	58	64	67	64	58
57.5	47	52	54	52	47
60.0	38	42	44	42	38
62.5	31	34	35	33	30
65.0	23	26	28	26	23
67.5	17	20	22	20	18
70.0	16	17	18	17	16
72.5	15	15	15	15	15
75.0	12	13	12	13	12
77.5	10	10	10	10	10
80.0	8	8	8	8	8
82.5	5	5	5	5	5
85.0	3	3	3	3	3
87.5	1	1	1	1	1
90.0	0	0	0	0	0



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5-DEGREE		
ZONAL	LUMEN	SUMMARY
0-	5	11
5-	10	34
10-	15	53
15-	20	69
20-	25	81
25-	30	86
30-	35	83
35-	40	73
40-	45	58
45-	50	45
50-	55	33
55-	60	24
60-	65	16
65-	70	10
70-	75	8
75-	80	5
80-	85	3
85-	90	1

10-DEGREE		
ZONAL	LUMEN	SUMMARY
0-	10	45
10-	20	123
20-	30	167
30-	40	156
40-	50	103
50-	60	57
60-	70	27
70-	80	13
80-	90	4



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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	119	119	119	119	116	116	116	116	111	111	111	111	106	106	106	102	102	102	100
1	112	108	105	102	109	106	103	101	102	100	97		98	96	94	95	93	92	90
2	104	98	93	89	102	96	92	88	93	89	86		90	87	84	87	84	82	80
3	97	89	83	78	95	88	82	77	85	80	76		82	78	75	80	76	73	72
4	91	81	74	69	89	80	74	69	78	72	68		76	71	67	74	70	66	64
5	85	75	67	62	83	74	67	62	72	66	61		70	65	61	68	64	60	58
6	80	69	61	56	78	68	61	56	66	60	55		65	59	55	63	58	55	53
7	75	63	56	51	73	63	56	51	61	55	51		60	54	50	59	54	50	48
8	70	59	52	47	69	58	51	47	57	51	46		56	50	46	55	50	46	44
9	66	55	48	43	65	54	48	43	53	47	43		52	47	43	51	46	42	41
10	63	51	44	40	61	51	44	40	50	44	40		49	43	39	48	43	39	38

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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### *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

### *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

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