

# Test Report

Report Number: L16094

Date: Jan 31, 2017

Issued by:

Dialight Optics Laboratory  
1501 Route 34 South, Farmingdale, NJ 07727

Test of one Vigilant Highbay  
Unit manufacturer: Dialight Corporation  
Unit model number: HEA9NC4KN-xxx

Issued to:

Dialight Corporation  
1501 Route 34 South, Farmingdale, NJ 07727

**Tests performed:** Photometric characterization and temperature measurement per the described standards.

**Dates of test:** January 18, 2017 through January 27, 2017

**Standards used:** All tests are performed in accordance with procedures and guidelines prescribed by the American National Standards Institute (ANSI) or Illuminating Engineering Society of North America (IES):

- IES LM-79:2008: Electrical and Photometric Measurements of Solid-State Lighting Products
- ANSI/UL 1598:2008: Underwriters Laboratories Inc. Standard for Safety: Luminaires
- ENERGY STAR Manufacturer's Guide for Qualifying Solid State Lighting Luminaires Version 2.1

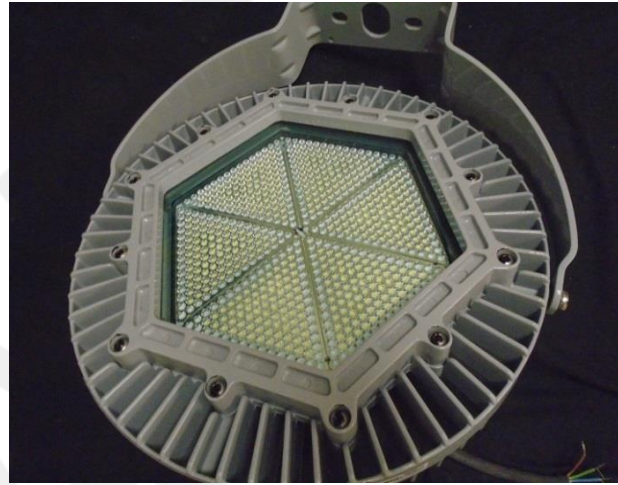
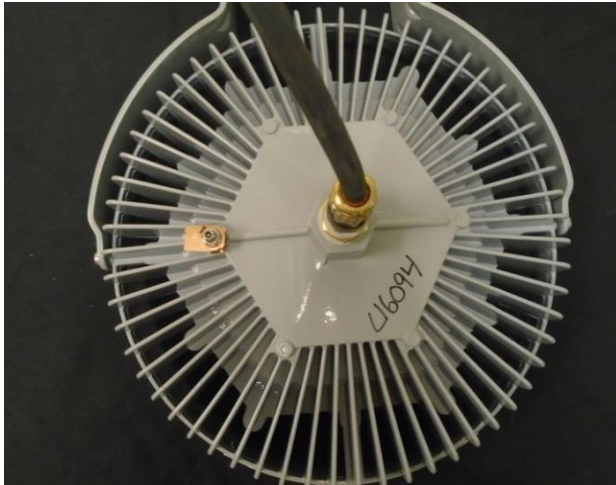
**Description of sample:**

Sample Number: L16094  
Manufacturer: Dialight Corporation  
Product Name: Vigilant  
Description: Vigilant Highbay  
Model Number: HEA9NC4KN-xxx

## Report Summary

Sample number L16094  
Dialight unit model number HEA9NC4KN-xxx

### Photograph(s) of sample:



\*Photographs not to scale. For reference only.

### Summary of Results:

	<u>Integrating Sphere</u>	<u>Goniophotometer</u>
Luminous Flux:	16310 (lumens)	16441 (lumens)
Electrical Power:	143.9 (W)	143.6 (W)
Luminous Efficacy:	113.3 (lumens/W)	114.5 (lumens/W)

### Electrical Measurements:

Input Power (120VAC): 143.9 (W)  
 Power Factor (120VAC): 0.995  
 Current ATHD % (120VAC): 8.153  
 Input Power (240VAC): 141.1 (W)  
 Power Factor (240VAC): 0.971  
 Current ATHD % (240VAC): 14.24

### Color Measurements:

Correlated Color Temperature (CCT): 5236  
 Color Rendering Index (CRI): 75.1  
 Chromaticity Coordinate (x): 0.339  
 Chromaticity Coordinate (y): 0.358  
 Chromaticity Coordinate (u'): 0.205  
 Chromaticity Coordinate (v'): 0.325  
 DUV: 0.0057

### Temperature Measurements:

In Situ LED Source Temperature: 60.5 (°C)

## Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L16094.

Dialight unit model number HEA9NC4KN-xxx

### Test Conditions:

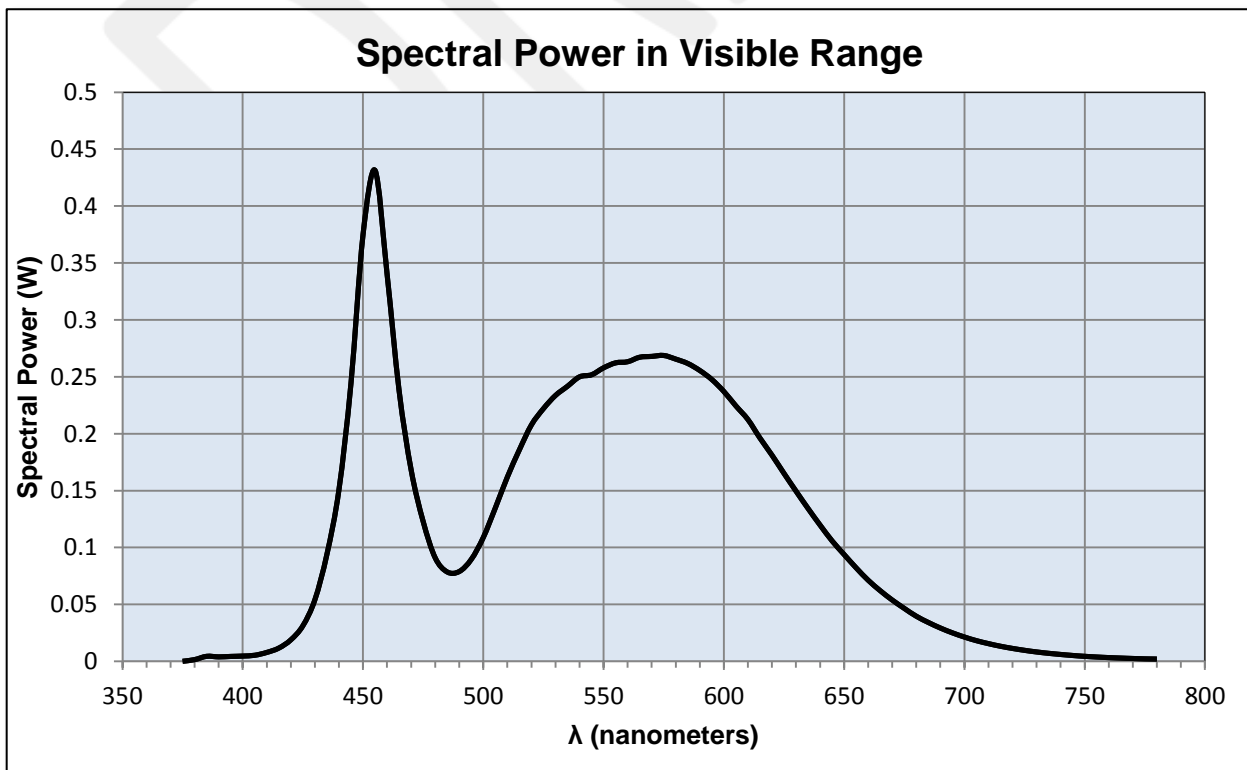
Ambient Temperature:  $25 \pm 1$  (°C)

### Electrical Measurements:

Input Voltage: 120 (VAC)  
Input Current: 1.204 (A)  
Input Power: 143.9 (W)  
Input Power Factor: 0.995  
Current ATHD: 8.153 (%)

### Photometric measurements:

Luminous Flux: 16310 (lumens)  
Luminous Efficacy: 113.3 (lumens/W)  
Correlated Color Temperature (CCT): 5236 (K)  
CRI -Ra: 75.1  
CRI -R9: -28.4  
DUV: 0.0057  
CIE Coordinate (x): 0.339  
CIE Coordinate (y): 0.358  
CIE Coordinate (u'): 0.205  
CIE Coordinate (v'): 0.325



## Test Results: Integrating Sphere

Results continued from previous page.

### Tabulated Spectral Power in Visible Range:

$\lambda(\text{nm})$	(W/nm)	$\lambda(\text{nm})$	(W/nm)	$\lambda(\text{nm})$	(W/nm)
375	0.000	515	0.186	655	0.082
380	0.002	520	0.208	660	0.071
385	0.004	525	0.222	665	0.062
390	0.004	530	0.234	670	0.054
395	0.004	535	0.242	675	0.047
400	0.005	540	0.250	680	0.040
405	0.005	545	0.252	685	0.034
410	0.008	550	0.258	690	0.029
415	0.012	555	0.262	695	0.025
420	0.019	560	0.263	700	0.021
425	0.031	565	0.267	705	0.018
430	0.054	570	0.268	710	0.016
435	0.094	575	0.269	715	0.013
440	0.151	580	0.266	720	0.011
445	0.244	585	0.262	725	0.010
450	0.375	590	0.256	730	0.008
455	0.431	595	0.248	735	0.007
460	0.340	600	0.237	740	0.006
465	0.238	605	0.224	745	0.005
470	0.168	610	0.212	750	0.004
475	0.123	615	0.196	755	0.004
480	0.091	620	0.181	760	0.003
485	0.079	625	0.165	765	0.003
490	0.079	630	0.150	770	0.003
495	0.090	635	0.134	775	0.002
500	0.109	640	0.120	780	0.002
505	0.135	645	0.106		
510	0.162	650	0.094		

## Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L16094.  
Dialight unit model number HEA9NC4KN-xxx

### Electrical Measurements:

Input Voltage: 120.1 (VAC)  
Input current: 1.202 (A)  
Input Power: 143.6 (W)  
Power Factor: 0.995

### Photometric measurements:

Absolute Luminous Flux: 16441 (lumens)  
Luminous Efficacy: 114.5 (lumens/W)

### Intensity Summary:

<u>INTENSITY (CANDLEPOWER) SUMMARY</u>						
ANGLE	ALONG	23	45	68	ACROSS	OUTPUT LUMENS
0	21223	21223	21223	21223	21223	
5	19761	19761	19761	19761	19761	753
15	12058	12058	12058	12058	12058	3091
25	7109	7109	7109	7109	7109	3371
35	5324	5324	5324	5324	5324	3321
45	3875	3875	3875	3875	3875	3198
55	1606	1606	1606	1606	1606	2136
65	131	131	131	131	131	470
75	48	48	48	48	48	69
85	17	17	17	17	17	30
95	0	0	0	0	0	3
105	0	0	0	0	0	0
115	0	0	0	0	0	0
125	0	0	0	0	0	0
135	0	0	0	0	0	0
145	0	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

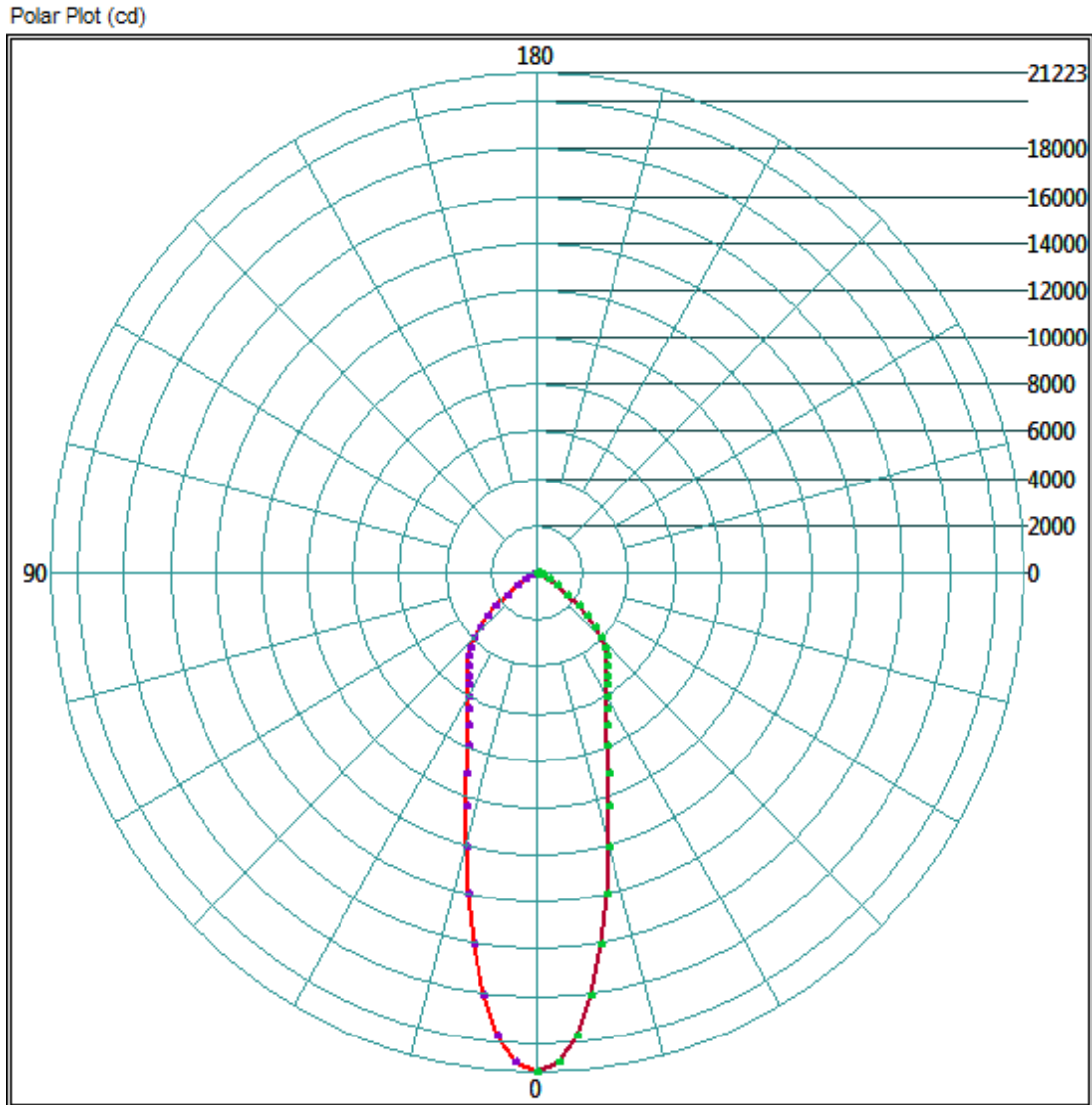
### ZONAL LUMEN AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	8863.68	53.9%
0-40	12184.8	74.1%
0-60	16240.32	98.8%
60-90	334.24	2.0%
0-90	16440.8	100.0%
90-180	0	0.0%
0-180	16440.8	100.0%

# Test Results: Goniometer

Results continued from previous page.

## Polar Plot:

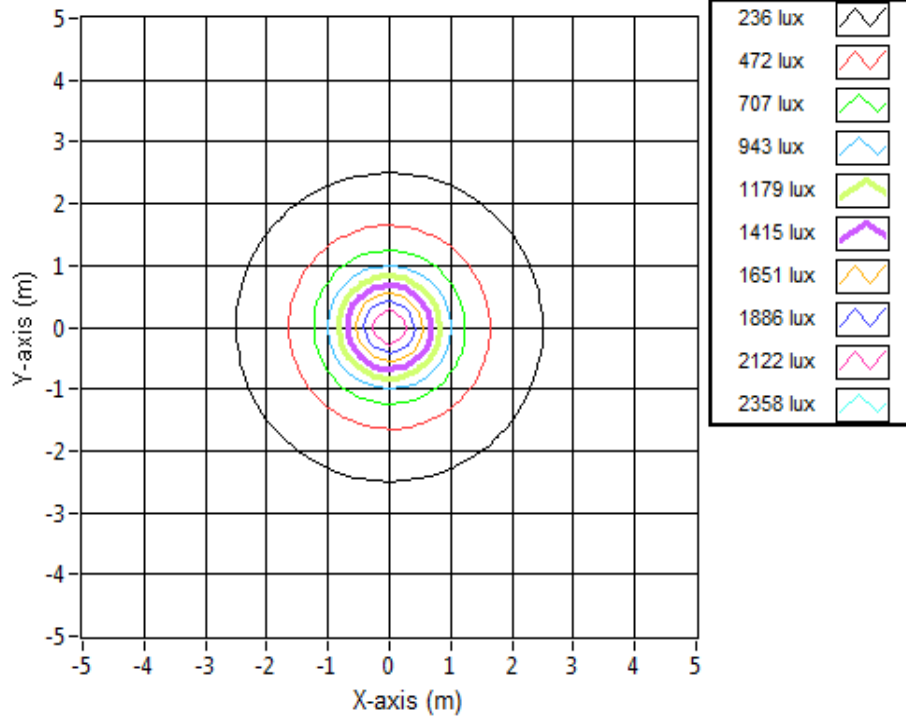


## Test Results: Goniometer

Results continued from previous page.

### Illuminance Plot:

Illuminance Contour Graph



### Illuminance-Cone of Light:

Mounting Height (m)	Beam Cone Width (m)	Orthogonal Beam Cone Width (m)	Projected Illuminance (lux)
3.048	1.89	1.89	2284.4
6.096	3.78	3.78	571.1
9.144	5.68	5.68	253.8
12.192	7.57	7.57	142.8
15.24	9.46	9.46	91.4
15.24	9.46	9.46	91.4
18.288	11.35	11.35	63.5
21.336	13.24	13.24	46.6
27.432	17.03	17.03	28.2
30.48	18.92	18.92	22.8

## Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L16094.  
Dialight unit model number HEA9NC4KN-xxx

LED identified as Nichia part number NT2W757DT.

LED drive current (as indicated by customer): 100 (mA)

### LED Specifications:

LED specifications are taken from LED manufacturer datasheet:

Maximum Forward Current (If): 300 (mA)  
Maximum Rated Power Dissipation: 1.05 (W)  
Maximum Junction Temp. (Tj): 120 (°C)  
Thermal Resistance (Rth): 18 (°C/W)

Derived Specifications:

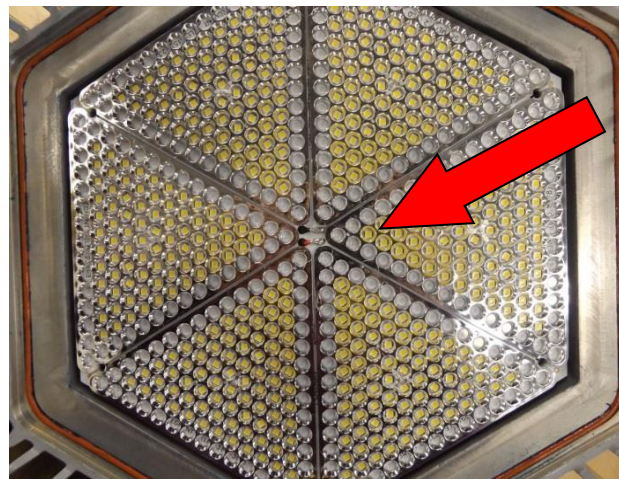
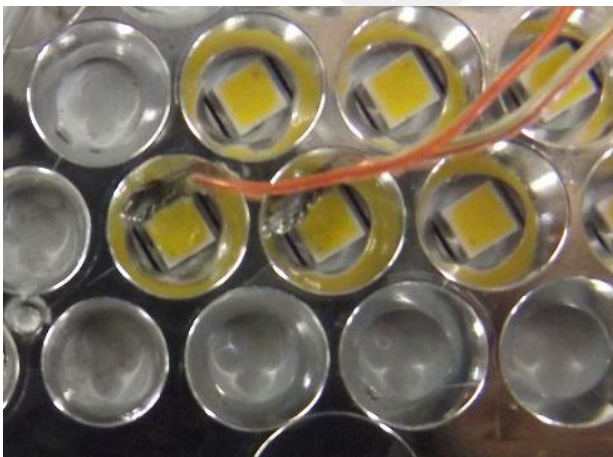
Maximum Power at Indicated Current: 0.35 (W)  
Maximum Source Temperature: 113.7 (°C)

### Test Conditions:

Temperature Measurement Location: See Photographs Below  
Ambient Temperature:  $25^{\circ} \pm 5'$  (°C)  
Ambient temperature at time of measurement: 23.7 (°C)  
Relative humidity at time of measurement: 10%

### Results:

**Measured LED source temperature: 60.5 (°C)**





**Equipment Used:**

Equipment Name	Model Number
Omega TC	Dpi8
Fluke 8808A Digit Multimeter	8808A
YOKOGAWA Digital Power Meter	11/26/3981
LSI High Speed Mirror Goniometer	6240T
Instrument System Spectrometer	CAS140B-151
Instrument System 1.5 Meter Sphere	ISP1500
Volttech Power Analyzer	PM1000+
Delta Elektronika DC Power Supply	SM.300-5
Elgar AC Power Supply	CW1251P
Instek AC Power Supply	APS-9501
Sorensen DC Power Supply	XHR150-7
Fluke 971 Humidity Meter	971
Extech Hygro-Thermometer	4/16/3120
Fluke 52II Thermometer	52II Thermometer
Volttech Power Analyzer	PM1000+
BK Precision	1715A
TDK-Lambda	GEN1500W
Fluke 8808A Digit Multimeter	8808A
TPI Digital Thermometer 343	TPI 343
TPI Digital Thermometer 343	TPI 343
Step-Up Transformer	
Omega TC	Dpi8-C24
Agilent True RMS OLED Multimeter	U1273A
Adaptive Power Systems AC Power Supply	FC-210
Xitron Power Analyzer	XT2640

**Additional Notes:**

Samples are received and tested in new and undamaged condition, unless otherwise noted. The results shown in this report are representative only of the test samples submitted. This data has been issued to the assignee for further evaluation. This report shall not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government. This report shall not be reproduced, except in full, without the express written permission of Dialight Optics Laboratory.

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