

# Test Report

Report Number: L14164

Date: Nov 5, 2014

Issued by:  
Dialight Optics Laboratory  
1501 Route 34 South, Farmingdale, NJ 07727

Test of one Vigilant Highbay Fixture  
Unit manufacturer: Dialight Corporation  
Unit model number: HEC9MC4DN-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:** November 1, 2014 through November 5, 2014

**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

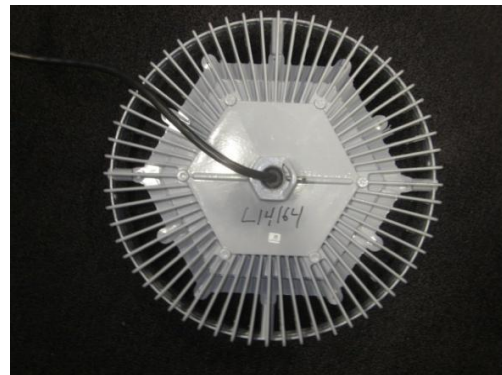
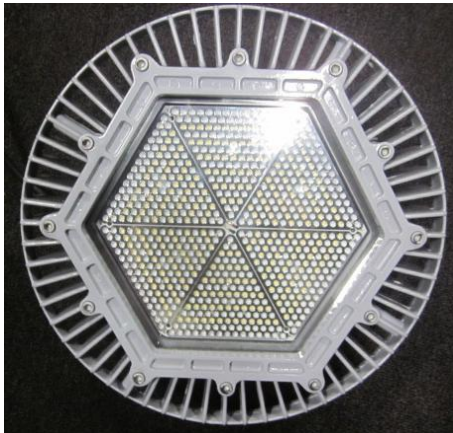
**Description of sample:**

Sample Number: L14164  
Manufacturer: Dialight Corporation  
Product Name: Vigilant  
Description: Vigilant Highbay Fixture  
Model Number: HEC9MC4DN-xxx

## Report Summary

Sample number L14164  
Dialight unit model number HEC9MC4DN-xxx

### Photograph(s) of sample:



\*Photographs not to scale. For reference only.

### Summary of Results:

	<u>Integrating Sphere</u>	<u>Goniophotometer</u>
Luminous Flux:	10160 (lumens)	10128 (lumens)
Electrical Power:	89.2 (W)	89.2 (W)
Luminous Efficacy:	113.9 (lumens/W)	113.6 (lumens/W)

### Electrical Measurements:

Input Power (120VAC): 89.2 (W)  
Power Factor (120VAC): 0.990  
Current ATHD % (120VAC): 10.17  
Input Power (277VAC): 88.4 (W)  
Power Factor (277VAC): 0.927  
Current ATHD % (277VAC): 17.028

### Color Measurements:

Correlated Color Temperature (CCT): 4991  
Color Rendering Index (CRI): 77.7  
Chromaticity Coordinate (x): 0.3456  
Chromaticity Coordinate (y): 0.3545  
Chromaticity Coordinate (u'): 0.2106  
Chromaticity Coordinate (v'): 0.3241  
DUV: 0.0012

### Temperature Measurements:

In Situ LED Source Temperature: 48.3 (°C)

## Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L14164.

Dialight unit model number HEC9MC4DN-xxx

### Test Conditions:

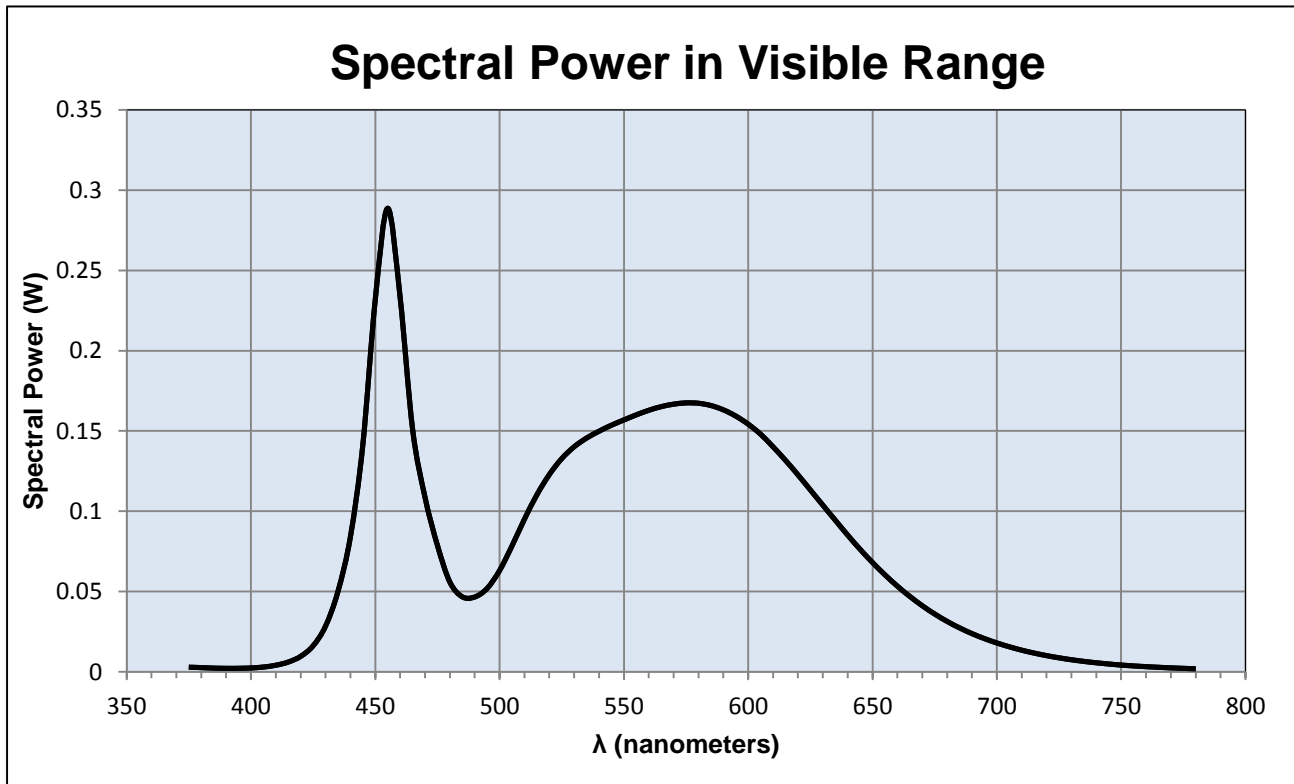
Ambient Temperature: 25 ± 1 (°C)

### Electrical Measurements:

Input Voltage: 120 (VAC)  
 Input Current: 0.7497 (A)  
 Input Power: 89.2 (W)  
 Input Power Factor: 0.99  
 Current ATHD: 10.165 (%)

### Photometric measurements:

Luminous Flux: 10160 (lumens)  
 Luminous Efficacy: 113.9 (lumens/W)  
 Correlated Color Temperature (CCT): 4991 (K)  
 CRI -Ra: 77.7  
 CRI -R9: -11  
 DUV: 0.0012  
 CIE Coordinate (x): 0.3456  
 CIE Coordinate (y): 0.3545  
 CIE Coordinate (u'): 0.2106  
 CIE Coordinate (v'): 0.3241



## 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	0.003	515	0.110	655	0.060
380	0.003	520	0.123	660	0.053
385	0.002	525	0.133	665	0.047
390	0.002	530	0.140	670	0.041
395	0.002	535	0.146	675	0.036
400	0.002	540	0.150	680	0.031
405	0.003	545	0.154	685	0.027
410	0.004	550	0.157	690	0.024
415	0.006	555	0.160	695	0.021
420	0.01	560	0.163	700	0.018
425	0.016	565	0.165	705	0.016
430	0.028	570	0.167	710	0.014
435	0.05	575	0.168	715	0.012
440	0.084	580	0.167	720	0.010
445	0.141	585	0.166	725	0.009
450	0.232	590	0.163	730	0.008
455	0.289	595	0.159	735	0.007
460	0.233	600	0.154	740	0.006
465	0.151	605	0.148	745	0.005
470	0.109	610	0.140	750	0.004
475	0.079	615	0.132	755	0.004
480	0.056	620	0.123	760	0.003
485	0.047	625	0.113	765	0.003
490	0.047	630	0.104	770	0.003
495	0.052	635	0.094	775	0.002
500	0.063	640	0.085	780	0.002
505	0.078	645	0.076		
510	0.095	650	0.068		

## Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L14164.  
Dialight unit model number HEC9MC4DN-xxx

### Electrical Measurements:

Input Voltage: 120 (VAC)  
Input current: 0.7494 (A)  
Input Power: 89.2 (W)  
Power Factor: 0.9908

### Photometric measurements:

Absolute Luminous Flux: 10128.1 (lumens)  
Luminous Efficacy: 113.6 (lumens/W)

### Intensity Summary:

<u>INTENSITY (CANDLEPOWER) SUMMARY</u>						
ANGLE	ALONG	22.5	45	67.5	ACROSS	OUTPUT LUMENS
0	4089	4093	4090	4092	4089	
5	4136	4070	4085	4125	4062	153
15	4068	4057	4074	4085	4041	869
25	4145	4190	4243	4177	4157	1625
35	3895	3880	3827	3845	3832	2372
45	2405	2382	2375	2440	2352	2647
55	718	672	665	700	686	1833
65	60	61	61	65	61	567
75	8	7	7	7	7	57
85	0	0	0	0	0	6
95	0	0	0	0	0	0
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

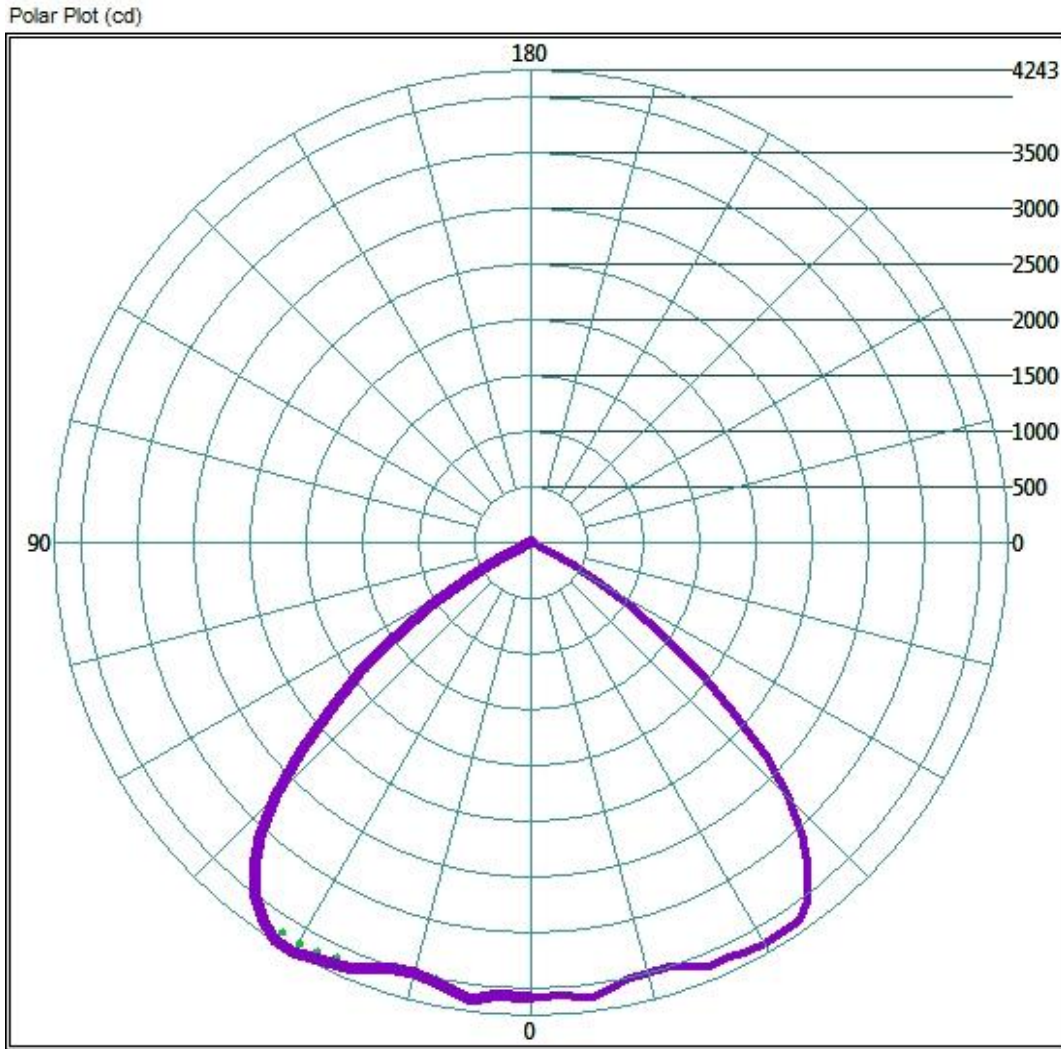
### ZONAL LUMEN AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	3746.42	37.0%
0-40	6370.98	62.9%
0-60	9905.54	97.8%
60-90	384.92	3.8%
0-90	10127.9	100.0%
90-180	0	0.0%
0-180	10127.9	100.0%

### Test Results: Goniometer

Results continued from previous page.

**Polar Plot:**



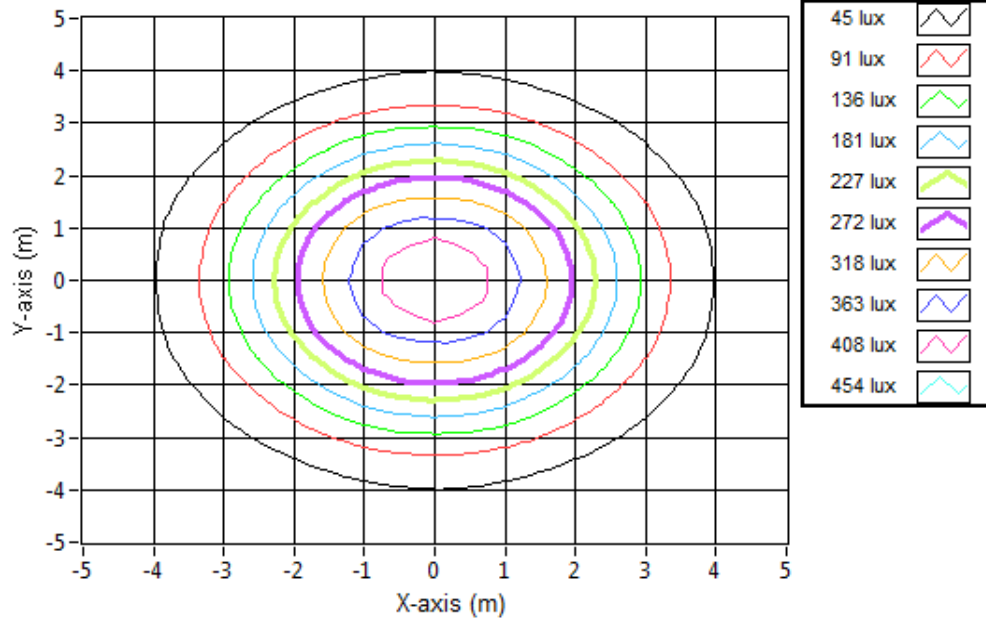


## Test Results: Goniometer

Results continued from previous page.

### Illuminance Plots:

Illuminance Contour Graph



### Illuminance-Cone of Light:

Mounting Height (m)	Beam Cone Width (m)	Orthogonal Beam Cone Width (m)	Projected Illuminance (lux)
3.048	7.83	7.70	439.4
6.096	15.66	15.41	109.9
9.144	23.49	23.11	48.8
12.192	31.32	30.82	27.5
15.24	39.15	38.52	17.6
18.288	46.99	46.22	12.2
21.336	54.82	53.93	9.0
24.384	62.65	61.63	6.9
27.432	70.48	69.34	5.4
30.48	78.31	77.04	4.4

## Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L14164.

Dialight unit model number HEC9MC4DN-xxx

LED identified as Nichia part number Nichia NT2W757DT 5000K.

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

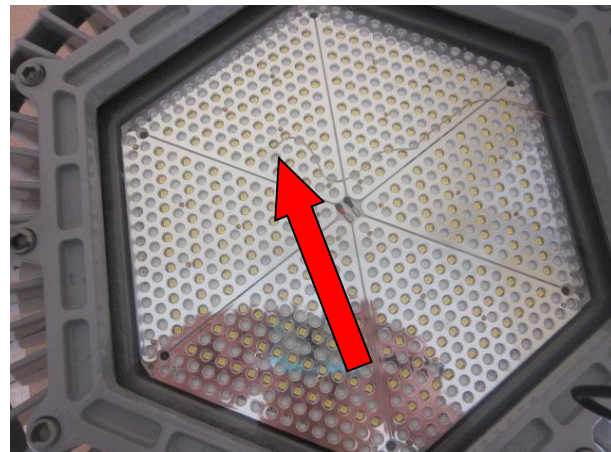
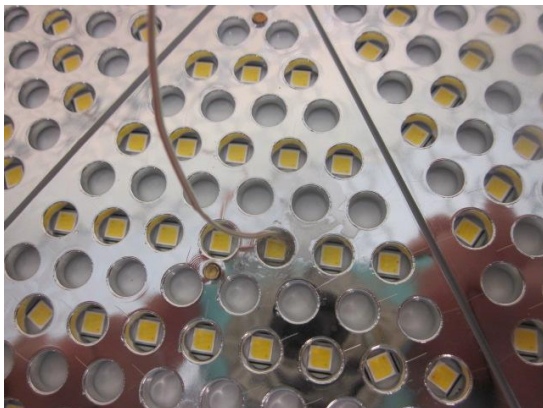
Ambient Temperature:  $25^{\circ} \pm 1^{\circ}$  (°C)

Ambient temperature at time of measurement: 24 (°C)

Relative humidity at time of measurement: 18%

### Results:

Measured LED source temperature: 48.3 (°C)





**Equipment Used:**

Equipment Name	Model Number	Calibration Due Date
Omega TC	Dpi8	3/7/2015
Fluke 8808A Digit Multimeter	8808A	4/7/2015
YOKOGAWA Digital Power Meter	760401	4/7/2015
LSI Standard Lamps	#30279	4/17/2015
LSI High Speed Mirror Goniometer	6240T	-
Instrument System Spectrometer	CAS140B-151	-
Instrument System Sphere Lamps (Osram Sylvania)	STD-20WF-3	4/17/2015
Instrument System Sphere Lamps (Osram Sylvania)	STD-20WF-3	4/17/2015
Instrument System Sphere Lamps (Osram Sylvania)	STD-20WF-3	4/17/2015
Instrument System 1.5 Meter Sphere	ISP1500	-
Volttech Power Analyzer	PM1000+	4/17/2015
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	-
Extech Hygro-Thermometer	445703	-
Extech Hygro-Thermometer	445703	-
Fluke 52II Thermometer	52II Thermometer	3/6/2015
Volttech Power Analyzer	PM1000+	4/17/2015
Tenma AC Power Source	72-7675	-
BK Precision	1715A	-
TDK-Lambda	GEN1500W	-
Fluke 8808A Digit Multimeter	8808A	4/14/2015
TPI Digital Thermometer 343	343	4/17/2015
TPI Digital Thermometer 343	343	4/17/2015

**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.

Test Report Issued By:

Richard Huegi  
Dialight Optics Laboratory  
Senior Optical Engineering Technician  
Lighting Division

Test Report Reviewed and Approved By:

Cecil Thomas  
Dialight Optics Laboratory  
Optical Engineering Manager  
Approved Signatory