Dialight
OPTICS LABORATORY

NVLAP
NVLAP Lab Code 201033-0

Test Report

Report Number: L15149 Date: Nov 3, 2015

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

Test of one Vigilant Highbay
Unit manufacturer: Dialight Corporation
Unit model number: HEC9NC4DN-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: October 29, 2015 through November 3, 2015

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: L15149
Manufacturer: Dialight Corporation
Product Name: Vigilant
Description: Vigilant Highbay
Model Number: HEC9NC4DN-xxx

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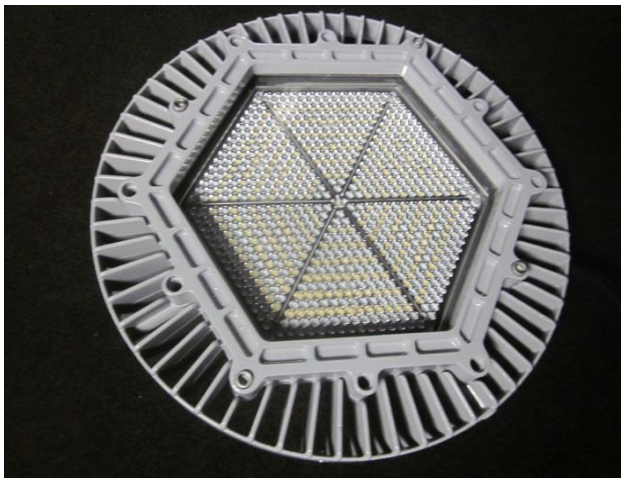
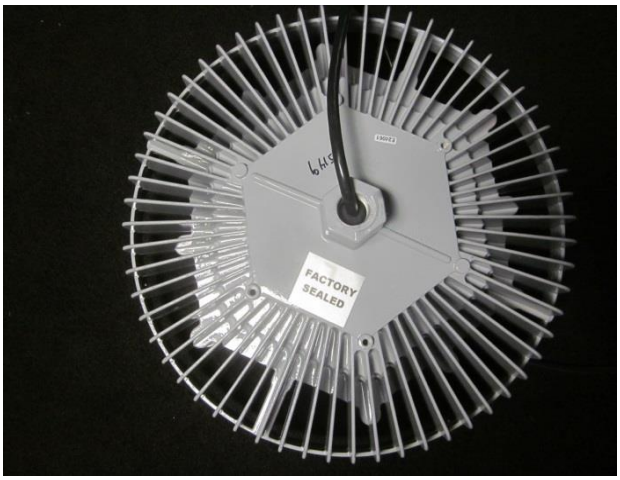
Report Summary

Sample number L15149

Dialight unit model number HEC9NC4DN-xxx

Photograph(s) of sample:





*Photographs not to scale. For reference only.

Summary of Results:

	Integrating Sphere		Goniophotometer	
Luminous Flux:	10305	(lumens)	10286	(lumens)
Electrical Power:	87.4	(W)	87.5	(W)
Luminous Efficacy:	118	(lumens/W)	117.5	(lumens/W)

Electrical Measurements:

Input Power (120VAC):	87.4	(W)
Power Factor (120VAC):	0.991	
Current ATHD % (120VAC):	10.28	
Input Power (277VAC):	87.4	(W)
Power Factor (277VAC):	0.942	
Current ATHD % (277VAC):	18.33	

Color Measurements:

Correlated Color Temperature (CCT):	4974
Color Rendering Index (CRI):	78.8
Chromaticity Coordinate (x):	0.346
Chromaticity Coordinate (y):	0.357
Chromaticity Coordinate (u'):	0.21
Chromaticity Coordinate (v'):	0.325
DUV:	0.0023

Temperature Measurements:

In Situ LED Source Temperature:	48.7	(°C)

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Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L15149.
Dialight unit model number HEC9NC4DN-xxx

Test Conditions:

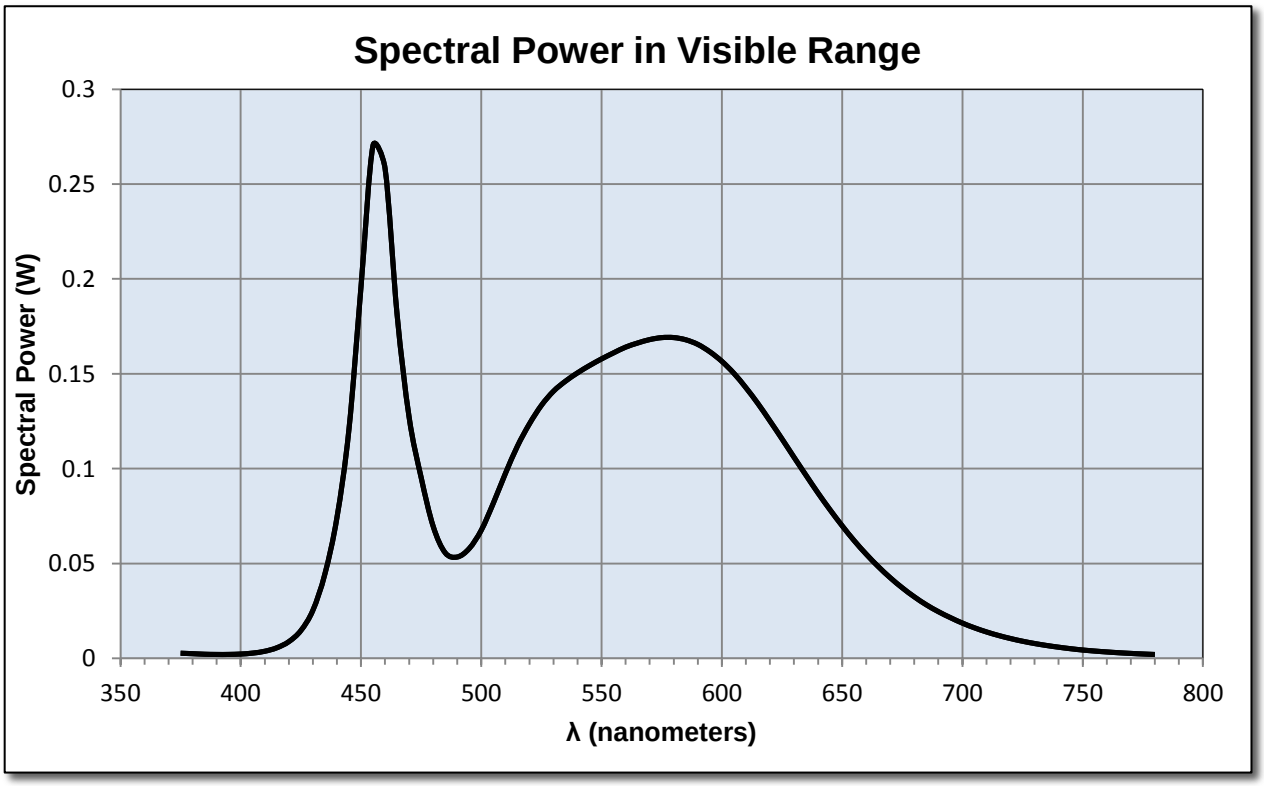
Ambient Temperature:	25 ± 1	(°C)

Electrical Measurements:

Input Voltage:	120	(VAC)
Input Current:	0.734	(A)
Input Power:	87.4	(W)
Input Power Factor:	0.991	
Current ATHD:	10.28	(%)

Photometric measurements:

Luminous Flux:	10305	(lumens)
Luminous Efficacy:	118.0	(lumens/W)
Correlated Color Temperature (CCT):	4974	(K)
CRI -Ra:	78.8	
CRI -R9:	-8.3	
DUV:	0.0023	
CIE Coordinate (x):	0.346	
CIE Coordinate (y):	0.357	
CIE Coordinate (u'):	0.21	
CIE Coordinate (v'):	0.325	



Test Results: Integrating Sphere

Results continued from previous page.

Tabulated Spectral Power in Visible Range:

λ(nm)	(W/nm)	λ(nm)	(W/nm)	λ(nm)	(W/nm)
375	0.003	515	0.112	655	0.062
380	0.002	520	0.124	660	0.055
385	0.002	525	0.133	665	0.048
390	0.002	530	0.141	670	0.042
395	0.002	535	0.146	675	0.037
400	0.002	540	0.15	680	0.032
405	0.003	545	0.154	685	0.028
410	0.004	550	0.158	690	0.025
415	0.006	555	0.161	695	0.021
420	0.009	560	0.164	700	0.019
425	0.015	565	0.166	705	0.016
430	0.025	570	0.168	710	0.014
435	0.045	575	0.169	715	0.012
440	0.074	580	0.169	720	0.01
445	0.121	585	0.168	725	0.009
450	0.196	590	0.165	730	0.008
455	0.27	595	0.162	735	0.007
460	0.258	600	0.157	740	0.006
465	0.181	605	0.15	745	0.005
470	0.127	610	0.143	750	0.004
475	0.095	615	0.134	755	0.004
480	0.07	620	0.125	760	0.003
485	0.056	625	0.116	765	0.003
490	0.053	630	0.106	770	0.003
495	0.058	635	0.096	775	0.002
500	0.068	640	0.087	780	0.002
505	0.082	645	0.078		
510	0.097	650	0.07		

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Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L15149.
Dialight unit model number HEC9NC4DN-xxx

Electrical Measurements:

Input Voltage:	120	(VAC)
Input current:	0.735	(A)
Input Power:	87.5	(W)
Power Factor:	0.991	

Photometric measurements:

Absolute Luminous Flux:	10286	(lumens)
Luminous Efficacy:	117.5	(lumens/W)

Intensity Summary:

INTENSITY (CANDLEPOWER) SUMMARY

ANGLE	ALONG	23	45	68	ACROSS	OUTPUT LUMENS
0	13572	13572	13572	13572	13572	
5	12608	12608	12608	12608	12608	481
15	7420	7420	7420	7420	7420	1929
25	4328	4328	4328	4328	4328	2058
35	3329	3329	3329	3329	3329	2043
45	2477	2477	2477	2477	2477	2045
55	1046	1046	1046	1046	1046	1382
65	77	77	77	77	77	292
75	26	26	26	26	26	38
85	7	7	7	7	7	15
95	0	0	0	0	0	1
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	

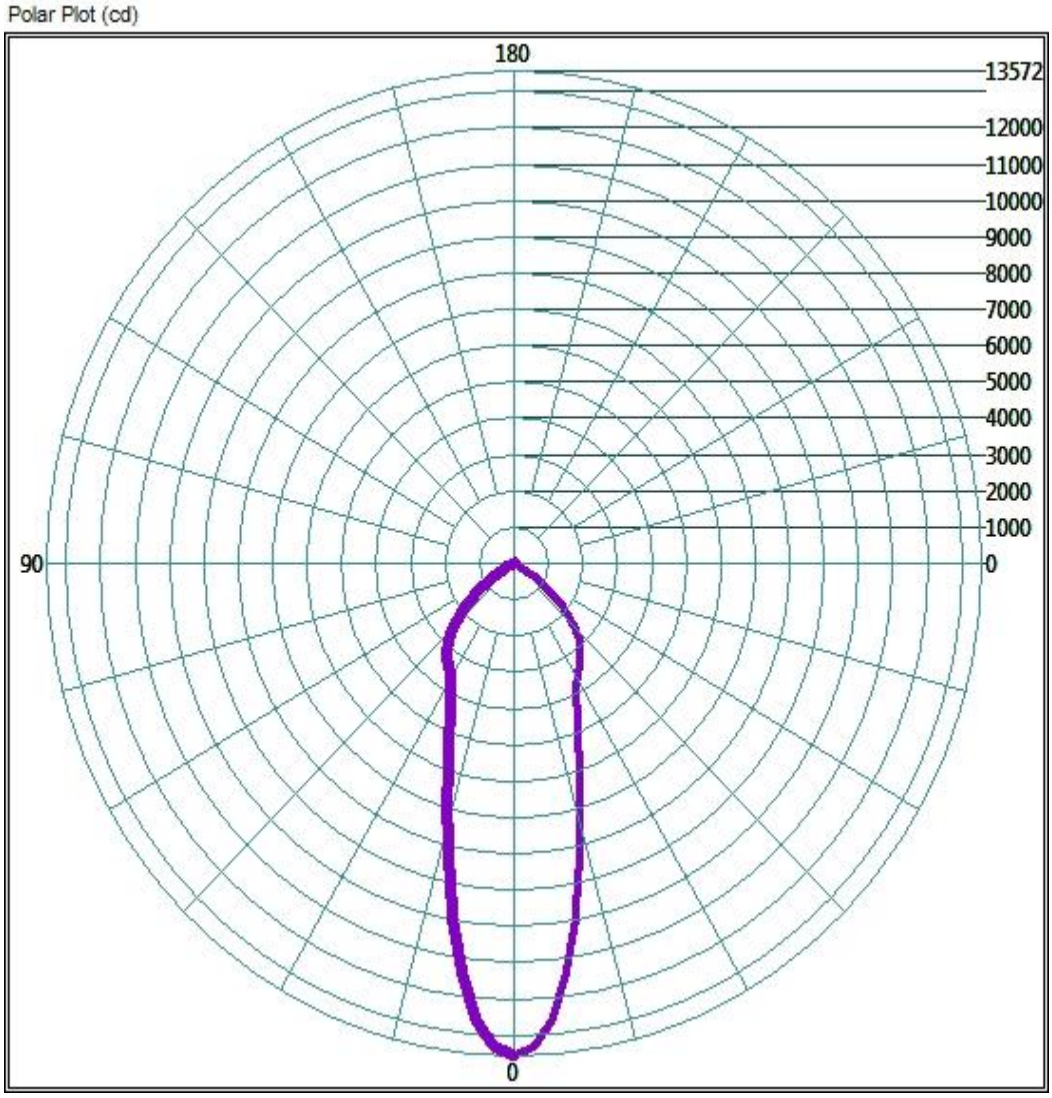
ZONAL LUMEN AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	5473.92	53.2%
0-40	7564.8	73.5%
0-60	10171.04	98.9%
60-90	197.76	1.9%
0-90	10285.92	100.0%
90-180	0	0.0%
0-180	10285.92	100.0%

Test Results: Goniometer

Results continued from previous page.

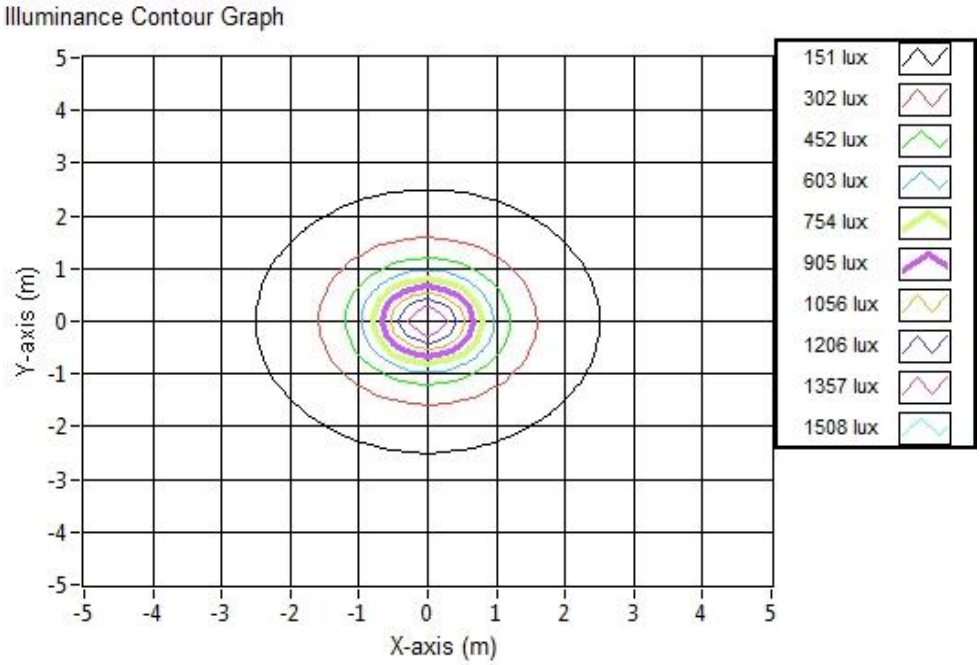
Polar Plot:



Test Results: Goniometer

Results continued from previous page.

Illuminance Plot:



Illuminance-Cone of Light:

Mounting Height (m)	Beam Cone Width (m)	Orthogonal Beam Cone Width (m)	Projected Illuminance (lux)
3.048	1.81	1.81	1460.9
6.096	3.62	3.62	365.2
9.144	5.44	5.44	162.3
12.192	7.25	7.25	91.3
15.24	9.06	9.06	58.4
18.288	10.87	10.87	40.6
21.336	12.69	12.69	29.8
24.384	14.50	14.50	22.8
27.432	16.31	16.31	18.0
30.48	18.12	18.12	14.6

Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L15149.
Dialight unit model number HEC9NC4DN-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:

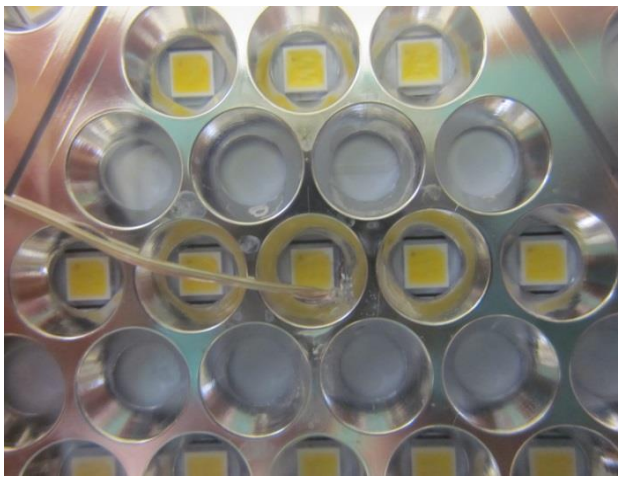
Maximum Power at Indicated Current:	0.35	(W)
Maximum Source Temperature:	113.7	(°C)

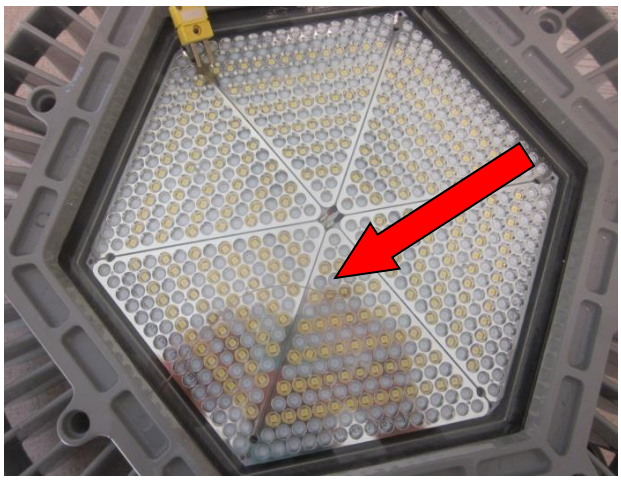
Test Conditions:

Temperature Measurement Location:	See Photographs Below	
Ambient Temperature:	25° ± 1‘	(°C)
Ambient temperature at time of measurement:	24.1	(°C)
Relative humidity at time of measurement:	43%	

Results:

Measured LED source temperature:	48.7	(°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
Extech Hygro-Thermometer	4/16/3120
Extech Hygro-Thermometer	4/16/3120
Fluke 52II Thermometer	52II Thermometer
Volttech Power Analyzer	PM1000+
BK Precison	1715A
TDK-Lambda	GEN1500W
Fluke 8808A Digit Multimeter	8808A
TPI Digitial Thermometer 343	TPI 343
TPI Digitial 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.

Test Report Issued By:

Richard Huegi
Dialight Optics Laboratory
Senior Optical Engineering Technician
Lighting Division

Test Report Reviewed and Approved By:

Vishnu Shastry
Dialight Optics Laboratory
Optical Engineer
Approved Signatory