

Test Report

Report Number: L16031

Date: Apr 18, 2016

Issued by:

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

Test of one Vigilant Highbay Clear Acrylic Lens
Unit manufacturer: Dialight Corporation
Unit model number: HE1MM4Kx-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: March 31, 2016 through April 11, 2016

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):

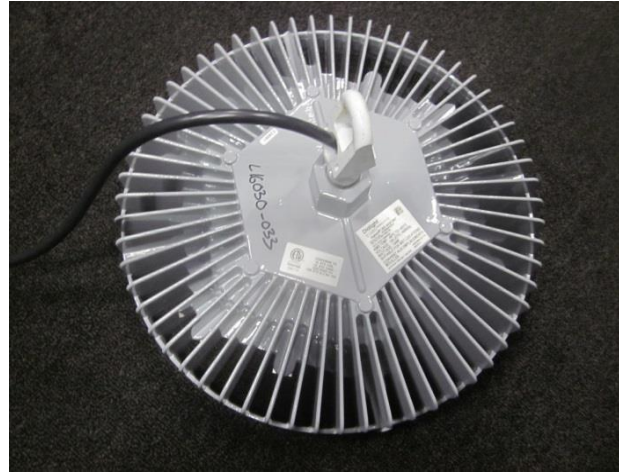
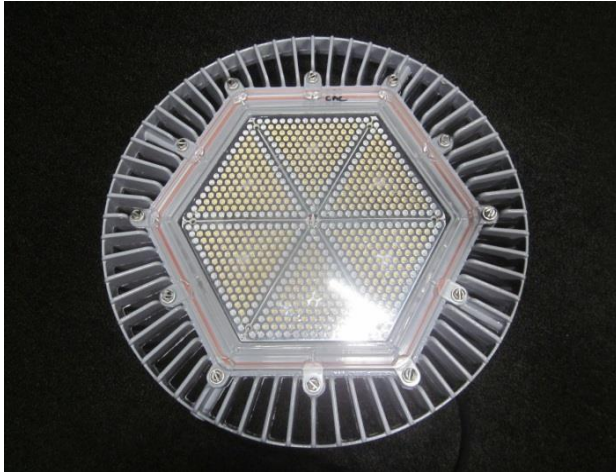
- IES LM-79:2008: Electrical and Photometric Measurements of Solid-State Lighting Products
- ANSI/UL 1598:2008: Underwriters Laboratories Inc. Standard for Safety: Luminaires
- ENERGY STAR Manufacturer's Guide for Qualifying Solid State Lighting Luminaires Version 2.1

Description of sample:

Sample Number: L16031
Manufacturer: Dialight Corporation
Product Name: Vigilant Highbay
Description: Vigilant Highbay Clear Acrylic Lens
Model Number: HE1MM4Kx-xxx

Report Summary
Sample number L16031
Dialight unit model number HE1MM4Kx-xxx

Photograph(s) of sample:



*Photographs not to scale. For reference only.

Summary of Results:

	<u>Integrating Sphere</u>	<u>Goniophotometer</u>
Luminous Flux:	16980 (lumens)	16731 (lumens)
Electrical Power:	143.5 (W)	143.4 (W)
Luminous Efficacy:	118.4 (lumens/W)	116.6 (lumens/W)

Electrical Measurements:

Input Power (120VAC): 143.5 (W)
 Power Factor (120VAC): 0.995
 Current ATHD % (120VAC): 8.249
 Input Power (277VAC): 140.7 (W)
 Power Factor (277VAC): 0.97
 Current ATHD % (277VAC): 13.72

Color Measurements:

Correlated Color Temperature (CCT): 3972
 Color Rendering Index (CRI): 82.6
 Chromaticity Coordinate (x): 0.384
 Chromaticity Coordinate (y): 0.385
 Chromaticity Coordinate (u'): 0.224
 Chromaticity Coordinate (v'): 0.337
 DUV: 0.0027

Temperature Measurements:

In Situ LED Source Temperature: 54.6 (°C)

Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L16031.
Dialight unit model number HE1MM4Kx-xxx

Test Conditions:

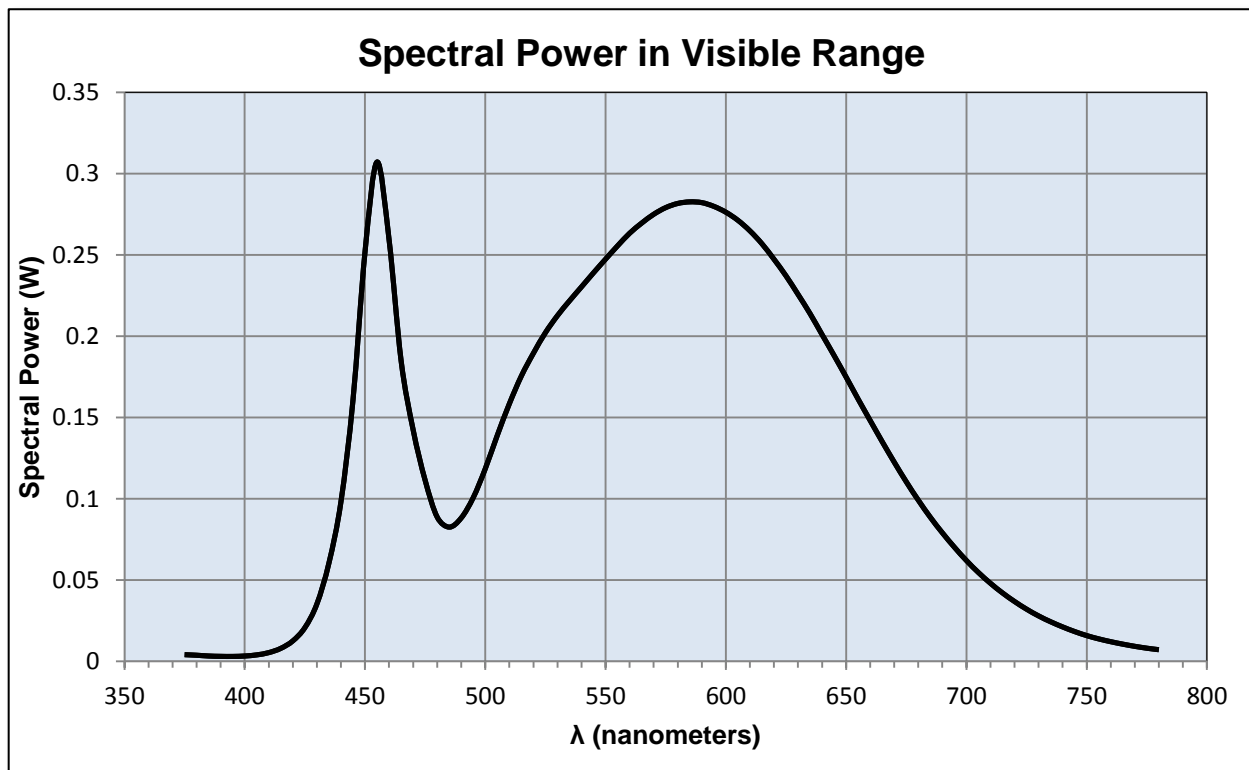
Ambient Temperature: 25 ± 1 (°C)

Electrical Measurements:

Input Voltage: 120 (VAC)
Input Current: 1.199 (A)
Input Power: 143.5 (W)
Input Power Factor: 0.995
Current ATHD: 8.249 (%)

Photometric measurements:

Luminous Flux: 16980 (lumens)
Luminous Efficacy: 118.4 (lumens/W)
Correlated Color Temperature (CCT): 3972 (K)
CRI -Ra: 82.6
CRI -R9: 19.1
DUV: 0.0027
CIE Coordinate (x): 0.384
CIE Coordinate (y): 0.385
CIE Coordinate (u'): 0.224
CIE Coordinate (v'): 0.337



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	0.004	515	0.175	655	0.161
380	0.004	520	0.189	660	0.148
385	0.003	525	0.202	665	0.135
390	0.003	530	0.213	670	0.123
395	0.003	535	0.222	675	0.110
400	0.003	540	0.230	680	0.099
405	0.004	545	0.239	685	0.089
410	0.005	550	0.247	690	0.079
415	0.008	555	0.256	695	0.070
420	0.013	560	0.263	700	0.062
425	0.021	565	0.269	705	0.055
430	0.035	570	0.275	710	0.048
435	0.060	575	0.279	715	0.042
440	0.098	580	0.282	720	0.037
445	0.161	585	0.283	725	0.032
450	0.252	590	0.282	730	0.028
455	0.307	595	0.280	735	0.024
460	0.259	600	0.276	740	0.021
465	0.185	605	0.271	745	0.018
470	0.142	610	0.265	750	0.016
475	0.111	615	0.257	755	0.014
480	0.089	620	0.247	760	0.012
485	0.083	625	0.237	765	0.011
490	0.088	630	0.226	770	0.009
495	0.101	635	0.214	775	0.008
500	0.118	640	0.201	780	0.007
505	0.139	645	0.188		
510	0.158	650	0.175		

Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L16031.
Dialight unit model number HE1MM4Kx-xxx

Electrical Measurements:

Input Voltage: 120 (VAC)
Input current: 1.2 (A)
Input Power: 143.4 (W)
Power Factor: 0.995

Photometric measurements:

Absolute Luminous Flux: 16731 (lumens)
Luminous Efficacy: 116.6 (lumens/W)

Intensity Summary:

INTENSITY (CANDLEPOWER) SUMMARY						
ANGLE	ALONG	23	45	68	ACROSS	OUTPUT LUMENS
0	6226	6226	6226	6226	6226	
5	6372	6372	6372	6372	6372	237
15	6589	6589	6589	6589	6589	1387
25	7274	7274	7274	7274	7274	2795
35	7074	7074	7074	7074	7074	4138
45	5191	5191	5191	5191	5191	4310
55	2155	2155	2155	2155	2155	2800
65	489	489	489	489	489	911
75	33	33	33	33	33	136
85	6	6	6	6	6	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	0

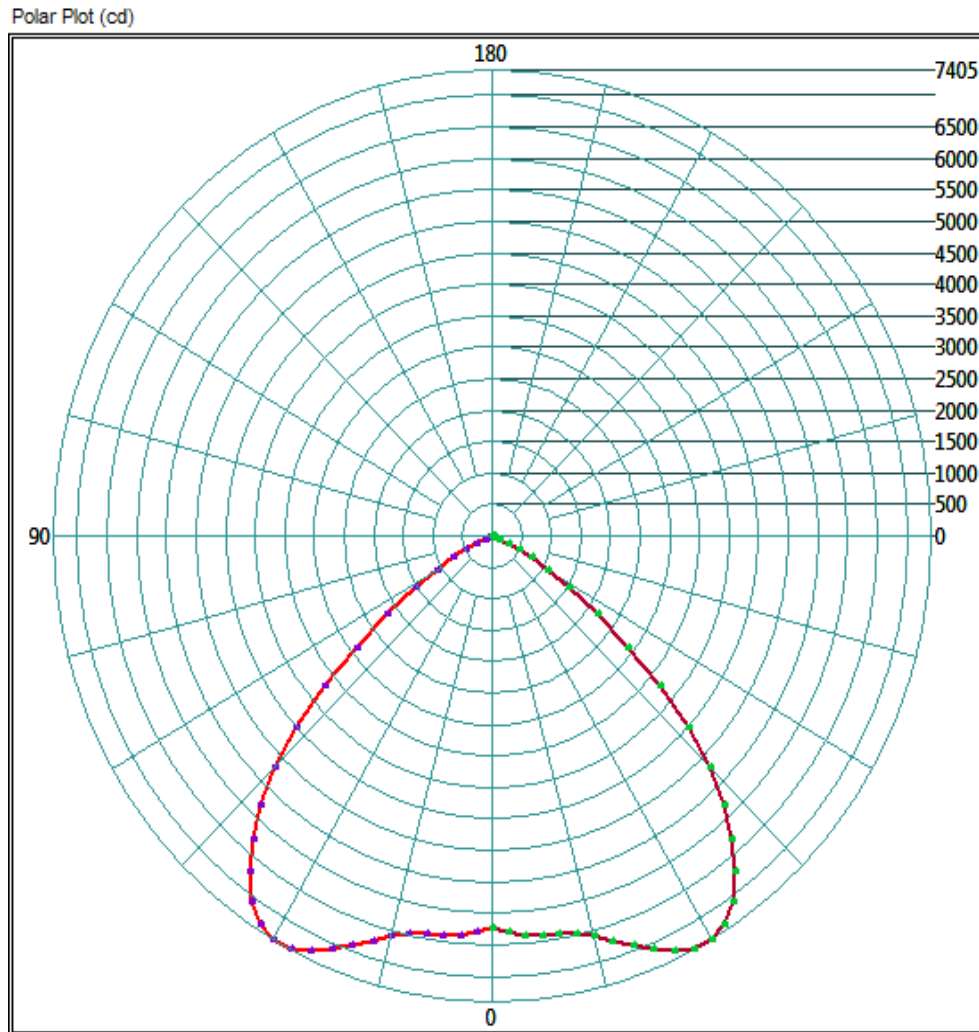
ZONAL LUMEN AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	6369.44	38.1%
0-40	10790.08	64.5%
0-60	16280	97.3%
60-90	706.72	4.2%
0-90	16731.2	100.0%
90-180	0	0.0%
0-180	16731.2	100.0%

Test Results: Goniometer

Results continued from previous page.

Polar Plot:

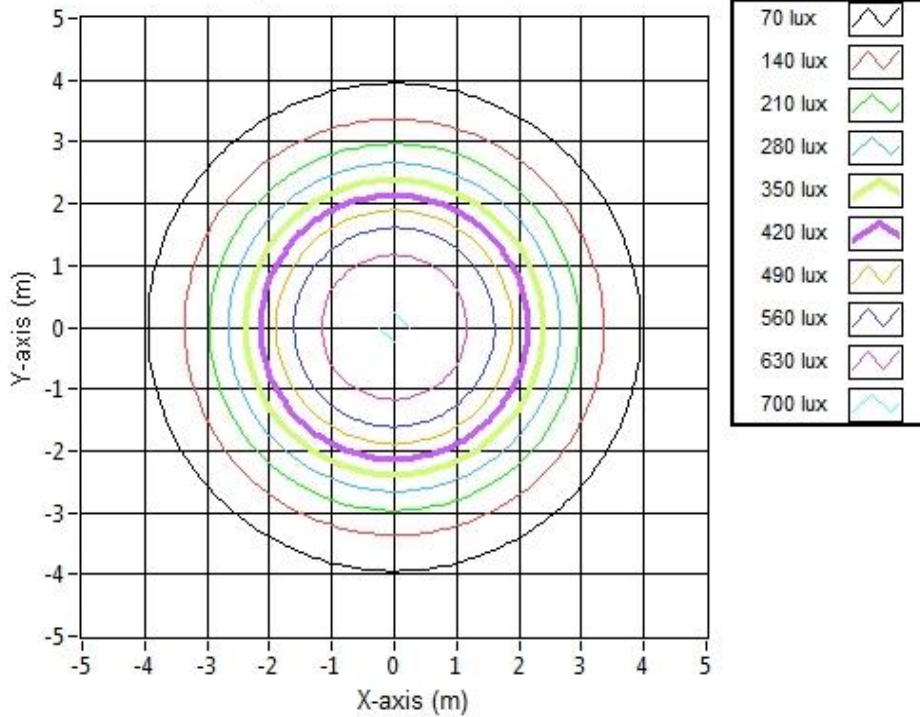


Test Results: Goniometer

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	7.76	7.76	670.1
6.096	15.51	15.51	167.5
9.144	23.27	23.27	74.5
12.192	31.03	31.03	41.9
15.24	38.79	38.79	26.8
18.288	46.54	46.54	18.6
21.336	54.30	54.30	13.7
24.384	62.06	62.06	10.5
27.432	69.82	69.82	8.3
30.48	77.57	77.57	6.7

Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L16031.
Dialight unit model number HE1MM4Kx-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:

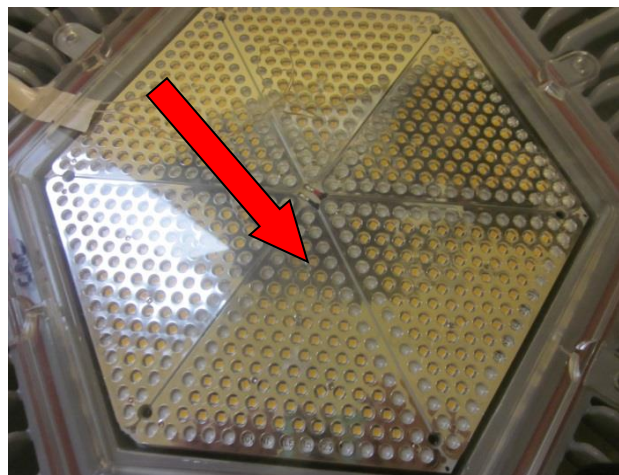
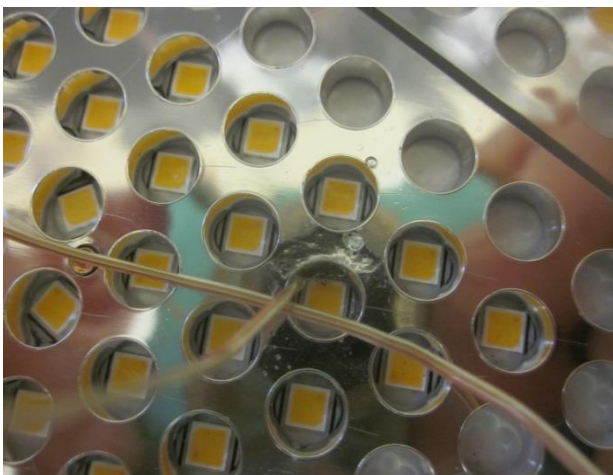
Maximum Power at Indicated Current: 0.35 (W)
Maximum Source Temperature: 113.7 (°C)

Test Conditions:

Temperature Measurement Location: See Photographs Below
Ambient Temperature: $25^{\circ} \pm 5^{\circ}$ (°C)
Ambient temperature at time of measurement: 23.5 (°C)
Relative humidity at time of measurement: 15%

Results:

Measured LED source temperature: 54.6 (°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 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.

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