Test Report

Report Number: L19021 Date: Apr 10, 2019

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

Test of one High Bay
Unit manufacturer: Dialight Corporation
Unit model number: RRE-4MC2-Gxxx-xxN

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: April 9, 2019 through April 10, 2019

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

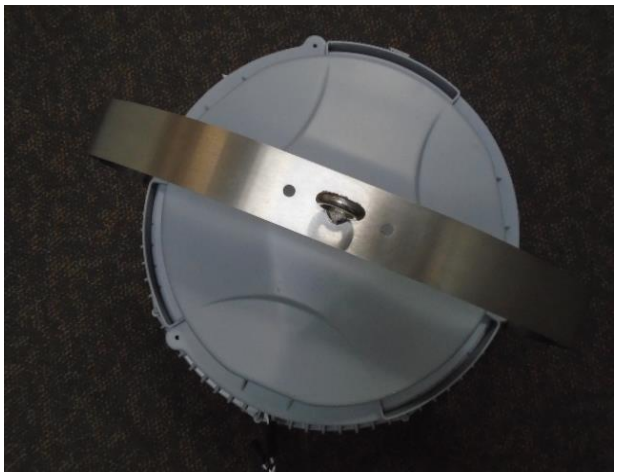
Description of sample:

Sample Number:	L19021
Manufacturer:	Dialight Corporation
Product Name:	Reliant High Bay
Description:	High Bay
Model Number:	RRE-4MC2-Gxxx-xxN

Report Summary

Sample number L19021
Dialight unit model number RRE-4MC2-Gxxx-xxN

Photograph(s) of sample:



*Photographs not to scale. For reference only.

Summary of Results:

	Integrating Sphere		Goniophotometer	
Luminous Flux:	28150	(lumens)	28379	(lumens)
Electrical Power:	192.0	(W)	192.0	(W)
Luminous Efficacy:	146.6	(lumens/W)	147.8	(lumens/W)

Electrical Measurements:

Input Power (230VAC):	192.0	(W)
Power Factor (230VAC):	0.985	
Current ATHD % (230VAC):	9.156	
Input Power (110VAC):	199.3	(W)
Power Factor (110VAC):	0.997	
Current ATHD % (110VAC):	4.083	

Color Measurements:

Correlated Color Temperature (CCT):	5034
Color Rendering Index (CRI):	86.5
Chromaticity Coordinate (x):	0.345
Chromaticity Coordinate (y):	0.354
Chromaticity Coordinate (u'):	0.21
Chromaticity Coordinate (v'):	0.324
DUV:	0.0016

Temperature Measurements:

In Situ LED Source Temperature:	55.7	(°C)

Test Results: Integrating Sphere

Results include unit color, flux, efficacy and electrical power for sample number L19021.
Dialight unit model number RRE-4MC2-Gxxx-xxN

Test Conditions:

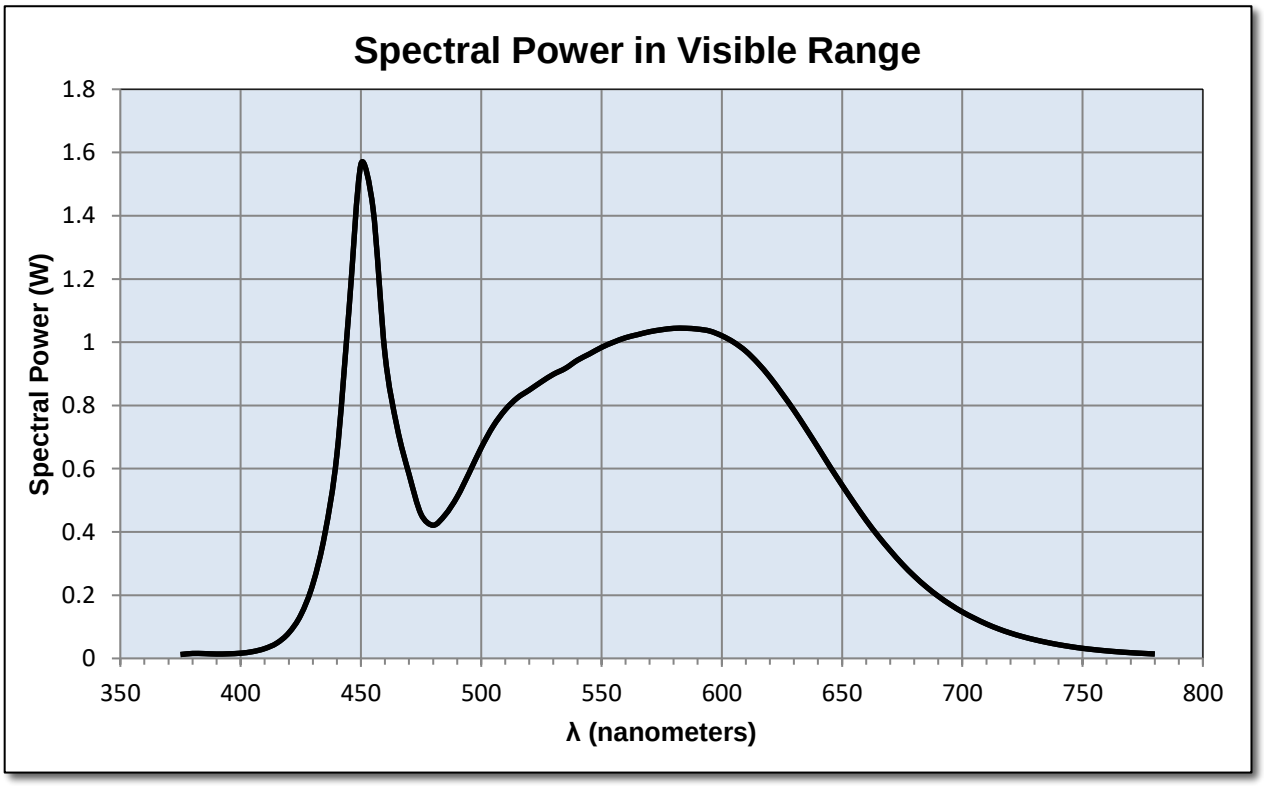
Ambient Temperature:	25 ± 1	(°C)

Electrical Measurements:

Input Voltage:	230	(VAC)
Input Current:	0.845	(A)
Input Power:	192.0	(W)
Input Power Factor:	0.985	
Current ATHD:	9.156	(%)

Photometric measurements:

Luminous Flux:	28150	(lumens)
Luminous Efficacy:	146.6	(lumens/W)
Correlated Color Temperature (CCT):	5034	(K)
CRI -Ra:	86.5	
CRI -R9:	23.1	
DUV:	0.0016	
CIE Coordinate (x):	0.345	
CIE Coordinate (y):	0.354	
CIE Coordinate (u'):	0.21	
CIE Coordinate (v'):	0.324	



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	0.012	515	0.824	655	0.492
380	0.016	520	0.849	660	0.437
385	0.015	525	0.875	665	0.387
390	0.014	530	0.899	670	0.342
395	0.015	535	0.917	675	0.299
400	0.017	540	0.943	680	0.260
405	0.022	545	0.963	685	0.227
410	0.031	550	0.984	690	0.197
415	0.048	555	1.000	695	0.170
420	0.081	560	1.014	700	0.147
425	0.137	565	1.024	705	0.127
430	0.235	570	1.033	710	0.109
435	0.393	575	1.040	715	0.094
440	0.644	580	1.044	720	0.080
445	1.099	585	1.044	725	0.069
450	1.563	590	1.042	730	0.059
455	1.426	595	1.035	735	0.051
460	0.963	600	1.021	740	0.044
465	0.733	605	1.000	745	0.037
470	0.582	610	0.972	750	0.032
475	0.456	615	0.934	755	0.028
480	0.421	620	0.890	760	0.024
485	0.454	625	0.838	765	0.021
490	0.511	630	0.785	770	0.018
495	0.587	635	0.727	775	0.016
500	0.666	640	0.667	780	0.014
505	0.735	645	0.606		
510	0.786	650	0.548		

Test Results: Goniometer

Results include unit flux, distribution, efficacy, and electrical power for sample number L19021.
Dialight unit model number RRE-4MC2-Gxxx-xxN

Electrical Measurements:

Input Voltage:	230	(VAC)
Input current:	0.848	(A)
Input Power:	192.0	(W)
Power Factor:	0.986	

Photometric measurements:

Absolute Luminous Flux:	28379	(lumens)
Luminous Efficacy:	147.8	(lumens/W)

Intensity Summary:

INTENSITY (CANDLEPOWER) SUMMARY

ANGLE	ALONG	23	45	67.5	ACROSS	OUTPUT LUMENS
0	10734	10734	10734	10734	10734	
5	10709	10709	10709	10709	10709	400
15	10757	10757	10757	10757	10757	2289
25	11421	11421	11421	11421	11421	4426
35	11576	11576	11576	11576	11576	6642
45	8857	8857	8857	8857	8857	7244
55	4511	4511	4511	4511	4511	5292
65	724	724	724	724	724	1752
75	120	120	120	120	120	259
85	38	38	38	38	38	68
95	0	0	0	0	0	7
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

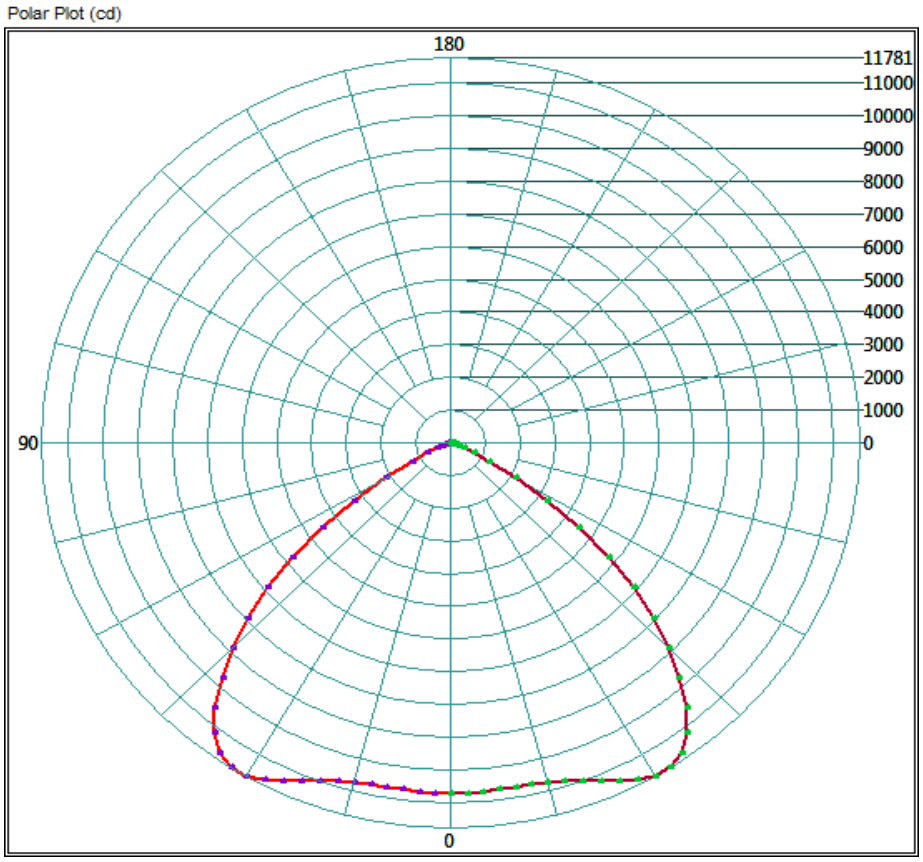
ZONAL LUMEN AND PERCENTAGES

ZONE	LUMENS	% LUMINAIRE
0-30	10202.88	36.0%
0-40	17479.84	61.6%
0-60	27559.36	97.1%
60-90	1327.84	4.7%
0-90	28379.2	100.0%
90-180	0	0.0%
0-180	28379.2	100.0%

Test Results: Goniometer

Results continued from previous page.

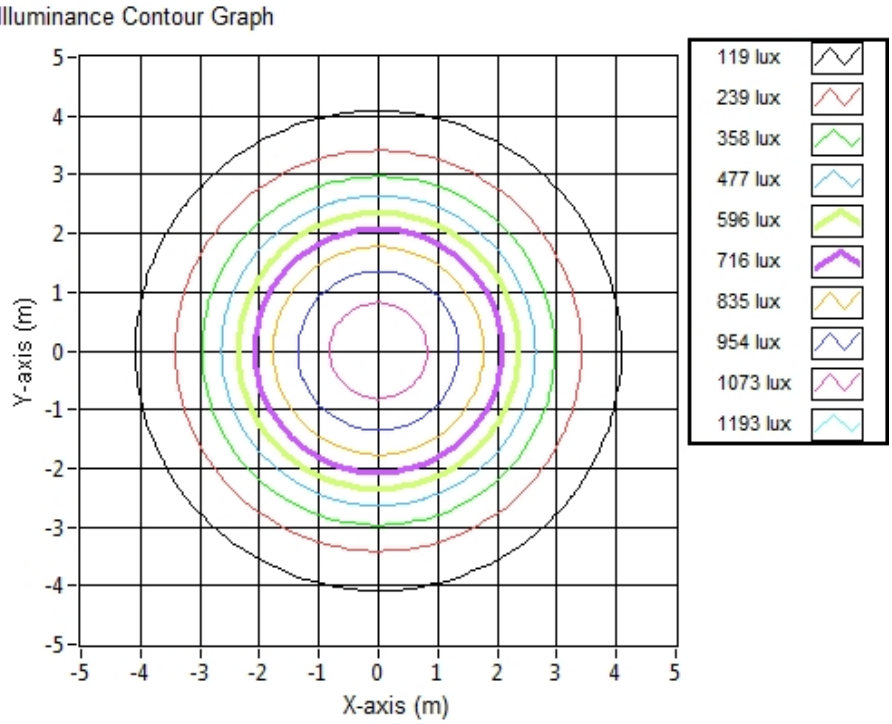
Polar Plot:



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	8.16	8.16	1155.4
6.096	16.31	16.31	288.8
9.144	24.47	24.47	128.4
12.192	32.62	32.62	72.2
15.24	40.78	40.78	46.2
18.288	48.93	48.93	32.1
21.336	57.09	57.09	23.6
24.384	65.24	65.24	18.1
27.432	73.40	73.40	14.3
30.48	81.55	81.55	11.6

Test Results: In Situ Temperature Measurement Test

Results include maximum LED chip temperature for sample number L19021.
Dialight unit model number RRE-4MC2-Gxxx-xxN

LED identified as Seoul Semiconductor part number SAW8C22B.

LED drive current (as indicated by customer): 29 (mA)

LED Specifications:

LED specifications are taken from LED manufacturer datasheet:

Maximum Forward Current (If):	250	(mA)
Maximum Rated Power Dissipation:	1.5	(W)
Maximum Junction Temp. (Tj):	125	(°C)
Thermal Resistance (Rth):	17	(°C/W)

Derived Specifications:

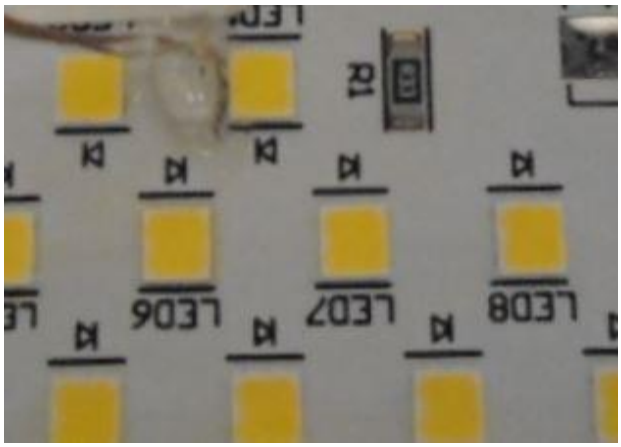
Maximum Power at Indicated Current:	0.174	(W)
Maximum Source Temperature:	122	(°C)

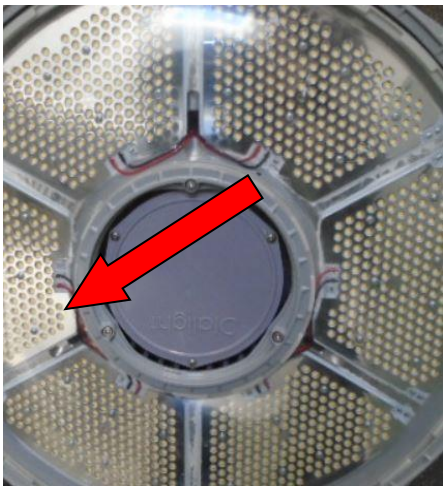
Test Conditions:

Temperature Measurement Location:	See Photographs Below	
Ambient Temperature:	25° ± 5‘	(°C)
Ambient temperature at time of measurement:	24	(°C)
Relative humidity at time of measurement:	31%	

Results:

Measured LED source temperature: 55.7 (°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
Delta Elektronika DC Power Supply	SM.300-5
Instek AC Power Supply	APS-9501
Sorensen DC Power Supply	XHR150-7
TPI Digital Thermometer	TPI 343
Fluke 52II Thermometer	068158
Fluke 971 Humidity Meter	971
Volttech Power Analyzer	PM1000+
Volttech Universal Breakout Box	PM1000+
BK Precison	1715A
Step-Up Transformer	
Omega TC	Dpi8-C24
Agilent True RMS OLED Multimeter	U1273A
ITL Osram Calibraton lamps for Goniometer	J9a8
ITL Osram Calibraton lamps for Goniometer	J9a8
ITL Osram Calibraton lamps for Goniometer	J9a8
Adaptive Power Systems AC Power Supply	FC-210
Xitron Power Analyzer	XT2640
GwINSTEK DC Power Supply	GEP172679
Osram Sylvania Calibration Lamp for Sphere	STD-20WF-3

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:

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Dialight Optics Laboratory
Senior Optical Engineering Technician
Lighting Division

Test Report Reviewed and Approved By:

Vishnu Shastry
Dialight Optics Laboratory
Optical Engineer
Approved Signatory