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NVLAP TESTING
NVLAP LAB CODE: 201058-0

REPORT NUMBER: RAB04534
ISSUE DATE: 08/15/18 **DATE SAMPLE TESTED:** 8/15/2018
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
CATALOG NUMBER: CDL2[WD, S, PC, PS]-10W20D927-ODLENS
LUMINAIRE: EXTRUDED BLACK PAINTED ALUMINUM HOUSING, 1 WHITE CIRCUIT BOARD WITH ONE LED, POLYCARBONATE TIR LENS ON TOP OF THE LED, ALUMINUM TRIM DOOR WITH GLASS LENS.
LAMP: ONE WHITE LIGHT EMITTING DIODES (LEDS).
NOTE: THIS REPORT WITH THE USE OF THE NVLAP LOGO SHALL NOT BE USED BY THE CLIENT TO CLAIM PRODUCT CERTIFICATION, APPROVAL, OR ENDORSEMENT BY NVLAP, NIST, OR ANY AGENCY OF THE FEDERAL GOVERNMENT.
ABSOLUTE: NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.
WATT: TOTAL INPUT WATTS = 11.7 W AT 277.0 VAC.
LED DRIVER: LED DRIVER: RDP-010-3EV40-A026
PROCEDURE: TEST PROCEDURE: IESNA LM-79-08
NOTE: LM-80 DATA AVAILABLE FROM MANUFACTURER FOR SOLID STATE SOURCE
AMBIENT: 25.5
NVLAP LAB CODE: ACCREDITED LABORATORY CODE 201058-0

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Checked *X.CAO*

Approved *D.WANG-MUNSON*

REPORT NUMBER: RAB04534 **PAGE:** 2 OF 6
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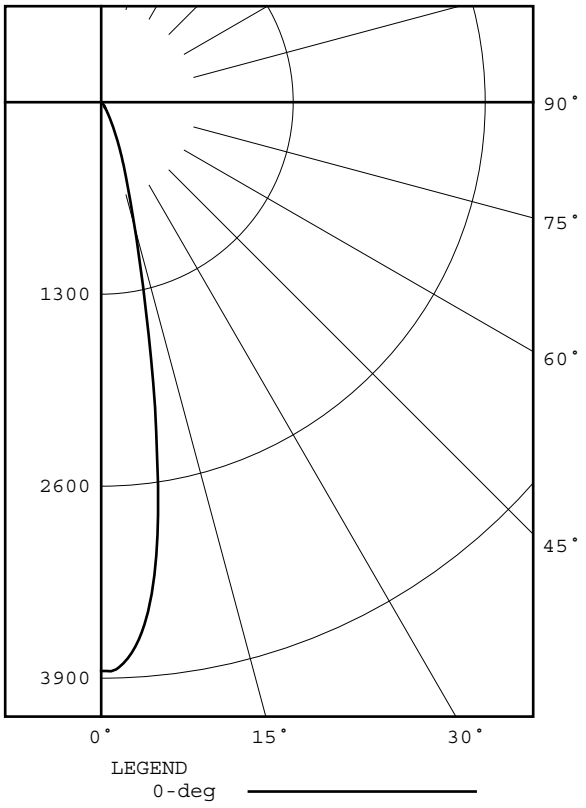
DEG	CANDELA	LUMENS
0	3851	
5	3508	289
15	878	262
25	203	98
35	48	33
45	17	14
55	4	4
65	0	0
75	0	0
85	0	0
90	0	
95	0	0
105	0	0
115	0	0
125	0	0
135	0	0
145	0	0
155	0	0
165	0	0
175	0	0
180	0	

ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	649	92.7
0- 40	681	97.4
0- 60	699	100.0
0- 90	699	100.0
90-120	0	0.0
90-130	0	0.0
90-150	0	0.0
90-180	0	0.0
0-180	699	100.0

EFFICACY = 59.7 lm/W
CIE TYPE - DIRECT
SPACING CRITERION: 0.35



REPORT NUMBER: RAB04534 **PAGE:** 3 OF 6
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CANDELA DISTRIBUTION

0.0	3851	60.0	1	120.0	0	180.0	0
1.0	3853	61.0	1	121.0	0		
2.0	3818	62.0	0	122.0	0		
3.0	3749	63.0	0	123.0	0		
4.0	3651	64.0	0	124.0	0		
5.0	3508	65.0	0	125.0	0		
6.0	3314	66.0	0	126.0	0		
7.0	3066	67.0	0	127.0	0		
8.0	2770	68.0	0	128.0	0		
9.0	2439	69.0	0	129.0	0		
10.0	2097	70.0	0	130.0	0		
11.0	1769	71.0	0	131.0	0		
12.0	1480	72.0	0	132.0	0		
13.0	1237	73.0	0	133.0	0		
14.0	1039	74.0	0	134.0	0		
15.0	878	75.0	0	135.0	0		
16.0	749	76.0	0	136.0	0		
17.0	643	77.0	0	137.0	0		
18.0	556	78.0	0	138.0	0		
19.0	482	79.0	0	139.0	0		
20.0	423	80.0	0	140.0	0		
21.0	368	81.0	0	141.0	0		
22.0	319	82.0	0	142.0	0		
23.0	276	83.0	0	143.0	0		
24.0	237	84.0	0	144.0	0		
25.0	203	85.0	0	145.0	0		
26.0	173	86.0	0	146.0	0		
27.0	148	87.0	0	147.0	0		
28.0	126	88.0	0	148.0	0		
29.0	109	89.0	0	149.0	0		
30.0	94	90.0	0	150.0	0		
31.0	82	91.0	0	151.0	0		
32.0	71	92.0	0	152.0	0		
33.0	61	93.0	0	153.0	0		
34.0	54	94.0	0	154.0	0		
35.0	48	95.0	0	155.0	0		
36.0	44	96.0	0	156.0	0		
37.0	40	97.0	0	157.0	0		
38.0	36	98.0	0	158.0	0		
39.0	33	99.0	0	159.0	0		
40.0	30	100.0	0	160.0	0		
41.0	28	101.0	0	161.0	0		
42.0	25	102.0	0	162.0	0		
43.0	22	103.0	0	163.0	0		
44.0	20	104.0	0	164.0	0		
45.0	17	105.0	0	165.0	0		
46.0	15	106.0	0	166.0	0		
47.0	14	107.0	0	167.0	0		
48.0	12	108.0	0	168.0	0		
49.0	11	109.0	0	169.0	0		
50.0	9	110.0	0	170.0	0		
51.0	8	111.0	0	171.0	0		
52.0	7	112.0	0	172.0	0		
53.0	6	113.0	0	173.0	0		
54.0	5	114.0	0	174.0	0		
55.0	4	115.0	0	175.0	0		
56.0	4	116.0	0	176.0	0		
57.0	3	117.0	0	177.0	0		
58.0	2	118.0	0	178.0	0		
59.0	2	119.0	0	179.0	0		

REPORT NUMBER: RAB04534 **PAGE:** 4 OF 6
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CATALOG NUMBER: CDL2[WD, S, PC, PS]-10W20D927-ODLENS

5-DEGREE ZONAL LUMEN SUMMARY

0- 5	88
5- 10	200
10- 15	162
15- 20	100
20- 25	63
25- 30	35
30- 35	20
35- 40	13
40- 45	9
45- 50	5
50- 55	3
55- 60	1
60- 65	0
65- 70	0
70- 75	0
75- 80	0
80- 85	0
85- 90	0
90- 95	0
95-100	0
100-105	0
105-110	0
110-115	0
115-120	0
120-125	0
125-130	0
130-135	0
135-140	0
140-145	0
145-150	0
150-155	0
155-160	0
160-165	0
165-170	0
170-175	0
175-180	0

10-DEGREE ZONAL LUMEN SUMMARY

0- 10	289
0- 20	551
0- 30	649
0- 40	681
0- 50	695
0- 60	699
0- 70	699
0- 80	699
0- 90	699
0-100	699
0-110	699
0-120	699
0-130	699
0-140	699
0-150	699
0-160	699
0-170	699
0-180	699

REPORT NUMBER: RAB04534 **PAGE:** 5 OF 6
ISSUE DATE: 08/15/18 **DATE SAMPLE TESTED:** 08/15/18
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CATALOG NUMBER: CDL2[WD, S, PC, PS]-10W20D927-ODLENS

COEFFICIENTS OF UTILIZATION - ZONAL CAVITY METHOD

EFFECTIVE FLOOR CAVITY REFLECTANCE 0.20

RC	80				70				50			30			10			0
RW	70	50	30	10	70	50	30	10	50	30	10	50	30	10	50	30	10	0
0	119	119	119	119	116	116	116	116	111	111	111	106	106	106	102	102	102	100
1	115	113	111	109	113	111	109	108	107	106	104	103	102	101	100	99	98	97
2	111	108	105	102	109	106	103	101	103	101	99	100	98	97	98	96	95	94
3	108	103	100	97	106	102	99	96	99	97	95	97	95	93	95	93	92	91
4	105	99	95	92	103	98	95	92	96	93	91	94	92	90	93	91	89	88
5	102	96	92	89	100	95	91	88	93	90	88	92	89	87	90	88	86	85
6	99	93	88	86	98	92	88	85	91	87	85	89	86	84	88	86	84	83
7	96	90	86	83	95	89	85	83	88	85	82	87	84	82	86	83	81	80
8	94	87	83	80	93	87	83	80	86	82	80	85	82	80	84	81	79	78
9	91	85	81	78	90	84	81	78	84	80	78	83	80	77	82	79	77	76
10	89	83	79	76	88	82	78	76	81	78	76	81	78	76	80	77	75	75

ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS TEST SAMPLE.

REPORT NUMBER: RAB04534 **PAGE:** 6 OF 6
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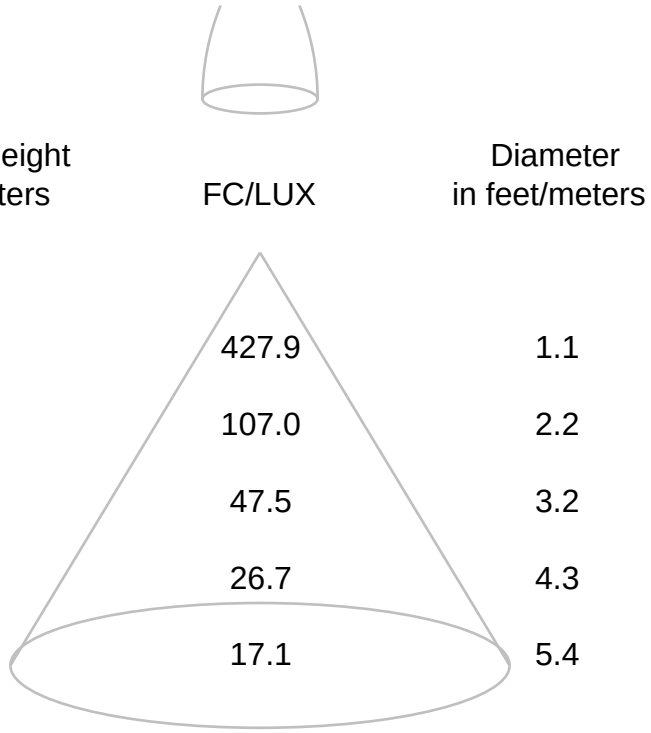
CONE OF LIGHT DIAGRAM

(diameter shown is where fc/lux value is half the fc/lux at nadir)



Mounting Height in feet/meters	FC/LUX	Diameter in feet/meters
3.0	427.9	1.1
6.0	107.0	2.2
9.0	47.5	3.2
12.0	26.7	4.3
15.0	17.1	5.4

If distances are feet, results are footcandles.
If distances are meters, results are lux.

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TESTING
NVLAP LAB CODE: 201058-0

REPORT NUMBER: RAB04548
DATE: 8/22/2018
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
CATALOG NUMBER: CDL2[WD, WU, S, PC, PS]-10W20D927-ODLENS

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: EXTRUDED BLACK PAINTED ALUMINUM HOUSING, 1 WHITE CIRCUIT BOARD WITH ONE LED, POLYCARBONATE TIR LENS ON TOP OF THE LED, ALUMINUM TRIM DOOR WITH GLASS LENS.

LAMP: ONE WHITE LIGHT EMITTING DIODES (LEDS).

DRIVER: RDP-010-3EV40-A026

OBJECT OF TEST: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT THE RATED INPUT VOLTAGES (277.0 AND 120.0 VAC, 60Hz) TO THE TEST SAMPLE.

INSTRUMENTS:	Calibration Due:
GWINSTEK PROGRAMMABLE AC POWER SOURCE APS-7100	N/A
CHROMA PROGRAMMABLE DIGITAL POWER METER MODEL 66202	3/08/19
OCEAN OPTICS QE65PRO Spectroradiometer	08/22/19
RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	08/22/19

OBJECT OF TEST: Measure the Absolute Flux in lumens*, Total Radiant Flux*, Spectral Power Distribution (SPD), Correlated Color Temperature (CCT), Color Rendering Indices (CRIa,1-14), Chromaticity Coordinates (x,y; u'v'), ANSI C78.377 Duv, and electrical data including ANSI C82.77-2002 Power Factor (PF), and Total Harmonic Distortion (THD) to the test sample. Measure electrical data including Total Harmonic Distortion (THD) at maximum nominal rated input voltage. Report Off-State Power.

PROCEDURE: The test sample was mounted inside the integrating sphere, energized, and allowed to stabilize. After stabilization occurred, measurements were taken. In order to measure mean performance, multiple data sets were recorded and averaged. Readings were taken with the test sample operating at 60 HZ input in a 25 +/-1 degree Celsius free air ambient and in accordance with IESNA LM-79-08. Electrical data was also recorded at maximum nominal rated input voltage (120.0 VAC). All data are traceable to the National Institute of Standards and Technology. Off-State Power was reported with no voltage applied to the sample.

*NOTE: Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even when these effects are compensated for, are likely to have a greater variation in results compared to the flux output calculated from a goniophotometric exploration since these artifacts do not affect the goniophotometric results.

RESULTS: (continued subsequent pages)

Checked X.CAO
Approved D.WANG-MUNSON
Lighting Engineer

REPORT NUMBER: RAB04548 Page 2 of 4
DATE: 8/22/2018
PREPARED FOR: RAB LIGHTING INC. RC LIGHTING
CATALOG NUMBER: CDL2[WD, WU, S, PC, PS]-10W20D927-ODLENS

RESULTS:

PHOTOMETRIC	
Total Integrated Flux (lumens)	699 *
SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4633
Chromaticity Ordinate y	0.4137
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2633
Chromaticity Ordinate v'	0.5291
Correlated Color Temp CCT (K)	2676
ANSI C78.377-2008 Duv	0.001
Total Radiant Flux (milliWatts)	2476 *
ELECTRICAL	
Input Voltage (Volts AC)	277.0
Input Current (Amps AC)	0.048
Input Power (Watts)	11.7
Input Power Factor (%)	87.9
Input Current THD (%)	26.0
Input Voltage THD (%)	0.2
EFFICACY (Lumens/Watt)	59.7
ELECTRICAL AT MAX NONIMAL INPUT	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.093
Input Power (Watts)	11.0
Input Power Factor (%)	99.2
Input Current THD (%)	10.4
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

COLOR RENDERING INDICES	CRI
Ra (Average 1-8)	92
R1 Light greyish red	92
R2 Dark greyish yellow	96
R3 Strong yellowish green	98
R4 Moderate yellowish green	92
R5 Light bluish green	92
R6 Light blue	96
R7 Light violet	92
R8 Light reddish purple	80
R9 Strong red	57
R10 Strong yellow	89
R11 Strong green	93
R12 Strong blue	83
R13 Light yellowish pink (skin)	93
R14 Moderate olive green (leaf)	98

*NOTE: Proper calibration of integrating spheres for measuring total flux output of non-directional samples will produce reliable, repeatable results within the calibration tolerances of the equipment used. However, measurement of test samples with significant self absorption and/or directional output, even when these effects are compensated for, are likely to have a greater variation in results compared to the flux output calculated from a goniophotometric exploration since these artifacts do not affect the goniophotometric results.

REPORT NUMBER: RAB04548 Page 3 of 4
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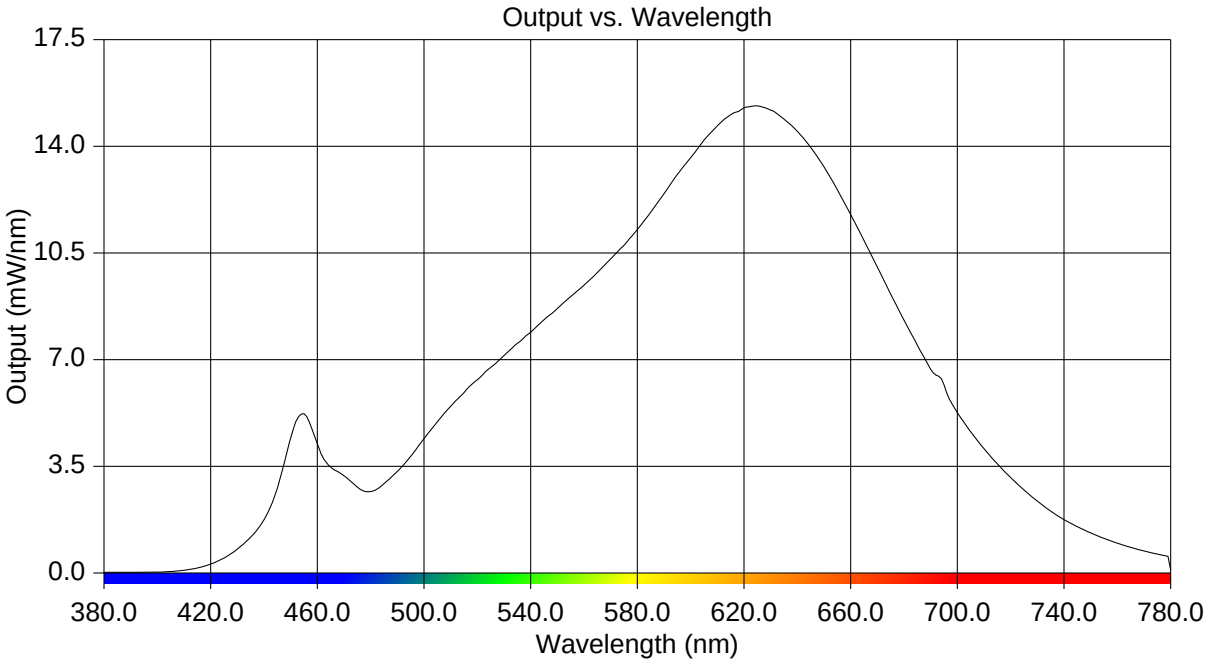
RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.020	515	5.917	650	13.317
385	0.019	520	6.336	655	12.579
390	0.021	525	6.743	660	11.766
395	0.023	530	7.131	665	10.923
400	0.031	535	7.534	670	10.038
405	0.047	540	7.898	675	9.152
410	0.085	545	8.310	680	8.295
415	0.163	550	8.680	685	7.475
420	0.294	555	9.071	690	6.684
425	0.486	560	9.446	695	6.177
430	0.785	565	9.859	700	5.268
435	1.178	570	10.316	705	4.638
440	1.744	575	10.750	710	4.077
445	2.801	580	11.265	715	3.584
450	4.428	585	11.835	720	3.136
455	5.228	590	12.442	725	2.720
460	4.240	595	13.076	730	2.353
465	3.473	600	13.620	735	2.028
470	3.190	605	14.206	740	1.751
475	2.817	610	14.670	745	1.516
480	2.671	615	15.039	750	1.318
485	2.934	620	15.265	755	1.139
490	3.334	625	15.331	760	0.976
495	3.828	630	15.186	765	0.840
500	4.401	635	14.895	770	0.724
505	4.967	640	14.491	775	0.621
510	5.481	645	13.969	780	0.093



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CIE Chromaticity Diagram