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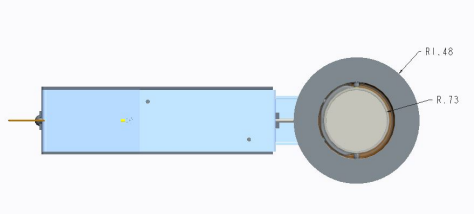
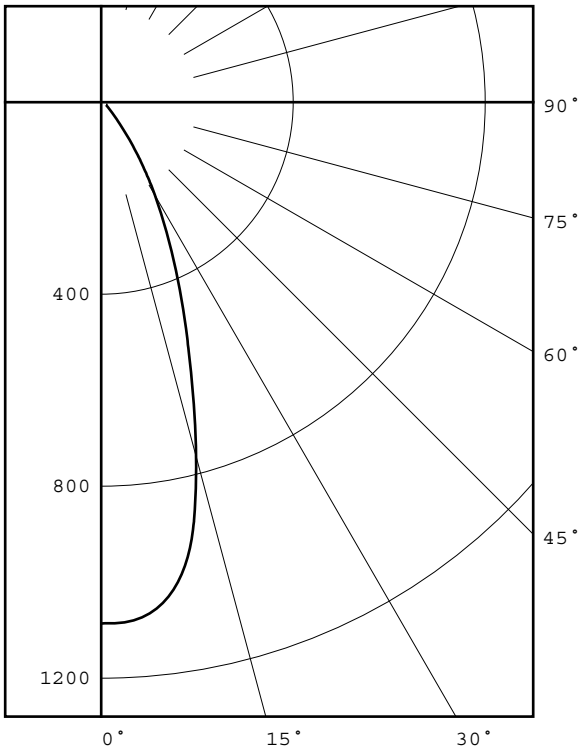
NVLAP LAB CODE: 201058-0

REPORT NUMBER: RAB02084 PAGE: 1 OF 8
ISSUE DATE: 06/17/16 DATE SAMPLE TESTED: 06/17/16
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: RDLED2AR8-40YY-TW
LUMINAIRE: FABRICATED METAL UPPER HOUSING AND BALLAST HOUSING, CAST BLACK PAINTED FINNED METAL HEAT SINK, CAST WHITE PAINTED METAL GIMBAL,1 WHITE CIRCUIT BOARD WITH ONE LED, MOLDED PLASTIC REFLECTOR WITH SPECULAR FINISH, HOLOGRAPHIC FLAT PLASTIC LENS, CAST WHITE METAL LOWER HOUSING.
LAMP: ONE WHITE MULTI-CHIP LIGHT EMITTING DIODE (LED) WITH CLEAR HEMISPHERICAL INTEGRAL LENS, VERTICALBASE-UP POSITION.
NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED.
TOTAL INPUT WATTS: 8.7065 W AT 120.0 VOLTS
(SEE PAGE 2 FOR MORE INFORMATION)



DEG	CANDELA	LUMENS
0	1086	
5	1073	100
15	764	209
25	351	162
35	128	82
45	35	29
55	16	15
65	10	10
75	6	6
85	2	2
90	0	



ZONAL LUMEN SUMMARY

ZONE	LUMENS	%FIXT
0- 30	471	76.6
0- 40	553	89.9
0- 60	597	97.0
0- 90	615	100.0
90-180	0	0.0
0-180	615	100.0

TOTAL INPUT WATTS = 8.7
EFFICACY = 70.7 Lm/W
CIE TYPE - DIRECT
LUMINAIRE SPACING CRITERION = 0.6
LUMINOUS DIAMETER: 0.730

LUMINANCE DATA IN CANDELA/SQ METER

ANGLE IN DEG	AVERAGE
45	183241.
55	103269.
65	87597.
75	85821.
85	84952.

Checked	X.CAO
Approved	D.WANG-MUNSON

REPORT NUMBER: RAB02084 PAGE: 2 OF 8
ISSUE DATE: 06/17/16 DATE SAMPLE TESTED: 06/17/16
PREPARED FOR: RAB LIGHTING INC.

ADDITIONAL INFORMATION

TEST PROCEDURE: IESNA LM-79-08
TEST DISTANCE: 28.25 FEET
PREPARED FOR: RAB LIGHTING INC.
LED DRIVER: RD-008-E1-A0200
ACCREDITED LABORATORY CODE 201085-0
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.

REPORT NUMBER: RAB02084 PAGE: 3 OF 8
ISSUE DATE: 06/17/16 DATE SAMPLE TESTED: 06/17/16
PREPARED FOR: RAB LIGHTING INC.

BEAM ANGLE (50%) : 39.1 DEGREES
FIELD ANGLE (10%): 72.6 DEGREES

REPORT NUMBER: RAB02084 PAGE: 4 OF 8
ISSUE DATE: 06/17/16 DATE SAMPLE TESTED: 06/17/16
PREPARED FOR: RAB LIGHTING INC.

CANDELA DISTRIBUTION

	0.0
0.0	1086
2.5	1085
5.0	1073
7.5	1044
10.0	988
12.5	893
15.0	764
17.5	635
20.0	524
22.5	432
25.0	351
27.5	282
30.0	224
32.5	172
35.0	128
37.5	91
40.0	64
42.5	46
45.0	35
47.5	27
50.0	22
52.5	19
55.0	16
57.5	14
60.0	13
62.5	11
65.0	10
67.5	9
70.0	8
72.5	7
75.0	6
77.5	5
80.0	4
82.5	3
85.0	2
87.5	1
90.0	0

REPORT NUMBER: RAB02084 PAGE: 5 OF 8
ISSUE DATE: 06/17/16 DATE SAMPLE TESTED: 06/17/16
PREPARED FOR: RAB LIGHTING INC.

ZONAL LUMEN SUMMARY

0- 5	26.
5- 10	74.
10- 15	104.
15- 20	105.
20- 25	91.
25- 30	72.
30- 35	51.
35- 40	31.
40- 45	18.
45- 50	11.
50- 55	8.
55- 60	7.
60- 65	5.
65- 70	5.
70- 75	4.
75- 80	3.
80- 85	2.
85- 90	1.

REPORT NUMBER: RAB02084 PAGE: 6 OF 8
ISSUE DATE: 06/17/16 DATE SAMPLE TESTED: 06/17/16
PREPARED FOR: RAB LIGHTING INC.

5-DEGREE ZONAL LUMEN SUMMARY

0- 5	26
5- 10	74
10- 15	104
15- 20	105
20- 25	91
25- 30	72
30- 35	51
35- 40	31
40- 45	18
45- 50	11
50- 55	8
55- 60	7
60- 65	5
65- 70	5
70- 75	4
75- 80	3
80- 85	2
85- 90	1
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	100
0- 20	309
0- 30	471
0- 40	553
0- 50	582
0- 60	597
0- 70	607
0- 80	613
0- 90	615
0-100	615
0-110	615
0-120	615
0-130	615
0-140	615
0-150	615
0-160	615
0-170	615
0-180	615

REPORT NUMBER: RAB02084 PAGE: 7 OF 8
ISSUE DATE: 06/17/16 DATE SAMPLE TESTED: 06/17/16

PREPARED FOR: RAB LIGHTING INC.

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	113	111	108	106	111	108	106	104	104	103	101	101	99	98	97	96	95	93
2	108	103	99	96	106	101	98	95	98	95	93	95	93	91	92	90	89	87
3	103	97	92	88	101	95	91	87	93	89	86	90	87	84	88	85	83	82
4	98	91	85	81	96	90	85	81	87	83	80	85	82	79	84	81	78	77
5	94	86	80	76	92	85	79	75	83	78	75	81	77	74	80	76	74	72
6	89	81	75	71	88	80	75	71	79	74	70	77	73	70	76	72	69	68
7	85	77	71	67	84	76	71	67	75	70	66	74	69	66	73	69	66	64
8	82	73	67	63	81	72	67	63	71	66	63	70	66	63	69	65	62	61
9	78	69	64	60	77	69	64	60	68	63	60	67	63	60	66	62	59	58
10	75	66	61	57	74	66	61	57	65	60	57	64	60	57	64	60	57	56

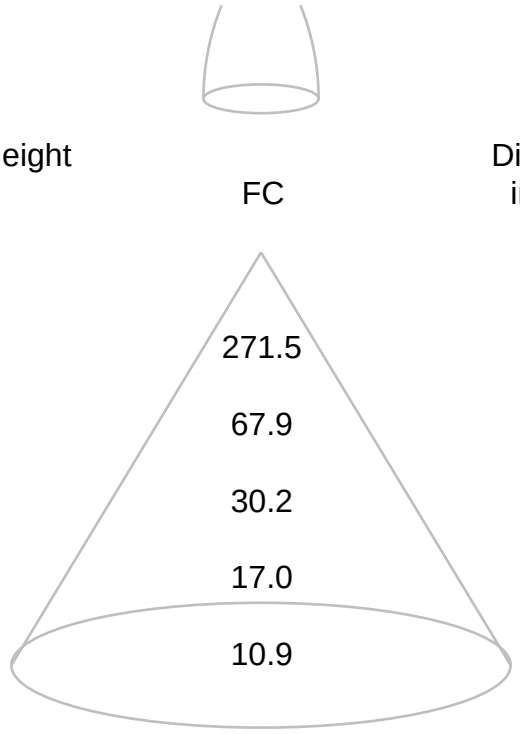
ALL CANDELA, LUMENS, LUMINANCE, AND VCP VALUES IN THIS REPORT ARE BASED ON ABSOLUTE PHOTOMETRY. THE COEFFICIENT OF UTILIZATION VALUES ARE BASED ON THE TOTAL ABSOLUTE LUMEN OUTPUT OF THIS LUMINAIRE SAMPLE.

REPORT NUMBER: RAB02084
ISSUE DATE: 06/17/16
PREPARED FOR: RAB LIGHTING INC.

DATE SAMPLE TESTED: 06/17/16

CONE OF LIGHT DIAGRAM

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



Mounting Height in feet	FC	Diameter in feet
2.0	271.5	1.3
4.0	67.9	2.5
6.0	30.2	3.8
8.0	17.0	5.1
10.0	10.9	6.4

NVLAP LAB CODE: 201058-0

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REPORT NUMBER: RAB02085
DATE: 6/13/2016
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: RDLED2AR8-40YY-TW

ADDRESS: 170 LUDLOW AVE, NORTHVALE, NJ 07647

LUMINAIRE: FABRICATED METAL UPPER HOUSING AND BALLAST HOUSING, CAST BLACK PAINTED FINNED METAL HEAT SINK, CAST WHITE PAINTED METAL GIMBAL,1 WHITE CIRCUIT BOARD WITH ONE LED, MOLDED PLASTIC REFLECTOR WITH SPECULAR FINISH, HOLOGRAPHIC FLAT PLASTIC LENS, CAST WHITE METAL LOWER HOUSING.

LAMP: ONE WHITE MULTI-CHIP LIGHT EMITTING DIODE (LED) WITH CLEAR HEMISPHERICAL INTEGRAL LENS, VERTICALBASE-UP POSITION.

DRIVER: RD-008-E1-A0200

NOTE: DATA SHOWN IS ABSOLUTE FOR THE SAMPLE PROVIDED AT RATED INPUT VOLTAGE (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	2/26/17
	OCEAN OPTICS QE65PRO Spectroradiometer	5/31/17
	RAB 2.0 meter Diameter Integrating Sphere, 4PI Geometry	5/31/17

OBJECT OF TEST: Measure the 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. Report Off-State Power.

PROCEDURE: The test sample was provided by the customer and had an unknown number of burn hours. The test sample was mounted inside the integrating sphere 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 120.0 VAC input in a 25 +/-1 degree Celsius free air ambient and in accordance with IESNA LM-79-08. 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: RAB02085 Page 2 of 4
DATE: 6/13/2016
PREPARED FOR: RAB LIGHTING INC.
CATALOG NUMBER: RDLED2AR8-40YY-TW

RESULTS:

SPECTRORADIOMETRIC	
Observer	CIE 1931 2 degree
Chromaticity Ordinate x	0.4548
Chromaticity Ordinate y	0.4068
Observer	CIE 1976 2 degree
Chromaticity Ordinate u'	0.2609
Chromaticity Ordinate v'	0.5251
Correlated Color Temp CCT (K)	2741
Color Rendering Index (CRIa)	83
Color Rendering Index 1 (Light greyish red)	81
Color Rendering Index 2 (Dark greyish yellow)	92
Color Rendering Index 3 (Strong yellowish green)	96
Color Rendering Index 4 (Moderate yellowish green)	81
Color Rendering Index 5 (Light bluish green)	82
Color Rendering Index 6 (Light blue)	91
Color Rendering Index 7 (Light violet)	81
Color Rendering Index 8 (Light reddish purple)	57
Color Rendering Index 9 (Strong red)	8
Color Rendering Index 10 (Strong yellow)	81
Color Rendering Index 11 (Strong green)	80
Color Rendering Index 12 (Strong blue)	78
Color Rendering Index 13 (Light yellowish pink (skin))	84
Color Rendering Index 14 (Moderate olive green (leaf))	99
ANSI C78.377-2008 Duv	-0.001
Total Radiant Flux (milliWatts)	1920 *
ELECTRICAL FOR SPECTRORADIOMETRIC TEST	
Input Voltage (Volts AC)	120.0
Input Current (Amps AC)	0.075
Input Power (Watts)	8.71
Input Power Factor (%)	96.4
Input Current THD (%)	24.4
Input Voltage THD (%)	0.2
Off-State Power (Watts)	0.0

*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: RAB02085
DATE: 6/13/2016
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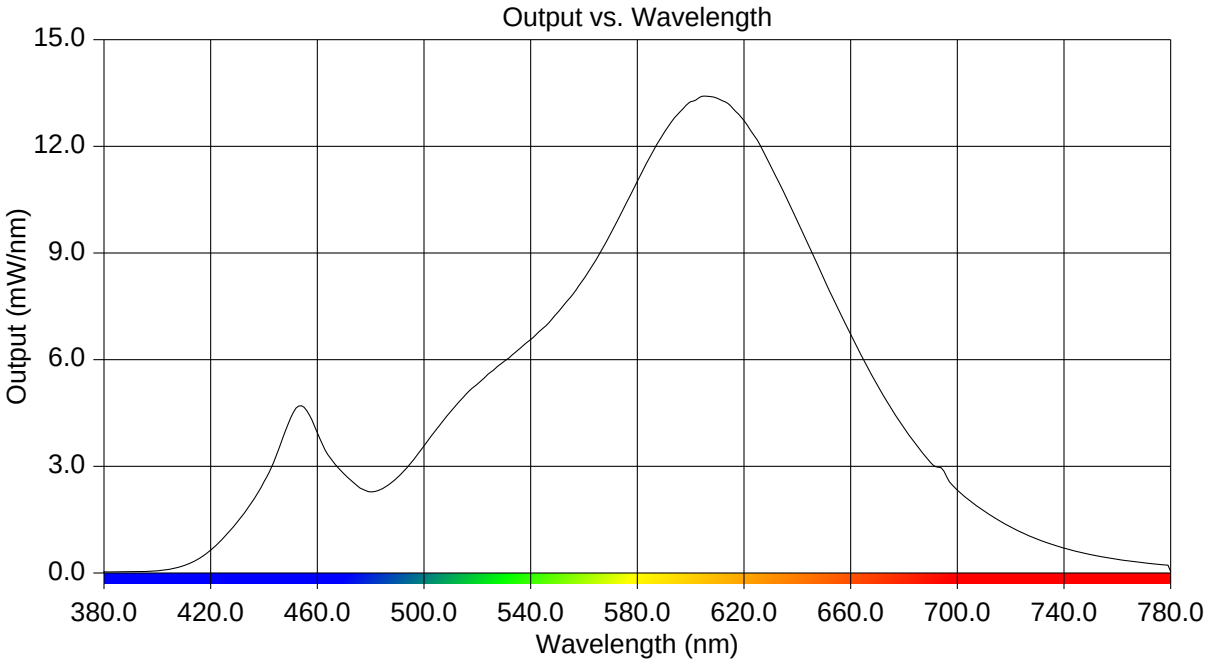
CATALOG NUMBER: RDLED2AR8-40YY-TW

RESULTS:

Wavelength	mW per nm	Wavelength	mW per nm	Wavelength	mW per nm
380	0.032	515	4.964	650	8.276
385	0.029	520	5.311	655	7.473
390	0.035	525	5.649	660	6.705
395	0.042	530	5.950	665	5.974
400	0.065	535	6.253	670	5.285
405	0.109	540	6.565	675	4.661
410	0.208	545	6.905	680	4.082
415	0.381	550	7.317	685	3.554
420	0.645	555	7.759	690	3.105
425	1.007	560	8.278	695	2.861
430	1.428	565	8.867	700	2.331
435	1.940	570	9.536	705	2.013
440	2.566	575	10.274	710	1.745
445	3.376	580	11.014	715	1.506
450	4.363	585	11.748	720	1.294
455	4.663	590	12.379	725	1.106
460	3.946	595	12.888	730	0.952
465	3.221	600	13.254	735	0.817
470	2.788	605	13.414	740	0.695
475	2.448	610	13.351	745	0.598
480	2.276	615	13.138	750	0.520
485	2.395	620	12.720	755	0.447
490	2.677	625	12.177	760	0.382
495	3.086	630	11.439	765	0.328
500	3.571	635	10.697	770	0.286
505	4.074	640	9.903	775	0.247
510	4.546	645	9.092	780	0.037



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CIE Chromaticity Diagram